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THE ROLE OF NAME CODING IN A PHYSICAL LETTER MATCHING TASK

by

© JANE V. CLIFTON

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

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IN

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled THE ROLE OF NAME CODING IN A PHYSICAL LETTER MATCHING TASK submitted by JANE V. CLIFTON in partial fulfilment of the requirements for the degree of Master of Science in Psychology.

Abstract

The relationship between the conceptualizations of automatic processes proposed by Shiffrin and Schneider (1977) and Posner and Snyder (1975), and Posner's (1978) hypothesis of code isolability is the main question considered here. The particular issue examined is whether codes which automatically activate each other, such as the physical and name codes of letters, are isolable. A priming paradigm was employed to determine the extent to which name and physical codes were accessed in the performance of a physical identity matching task. Some of the primes were physically identical to the target while some were of the opposite case but shared the same name. Posner and Snyder's (1975) criteria for evaluating the automatic and conscious aspects of prime processing were used. The use of name information in the task was discouraged by the instructions and by the introduction of target pairs which were of opposite case but shared the same name.

A significant facilitation of Same responses by physically identical primes was found, but the facilitation resulting from primes related only in name was not reliable. Different responses were significantly slower if the target letters shared the same name, indicating that letter name information was available even when disadvantageous. The priming effects were further analysed by dividing the subjects into two groups on the basis of presence or absence

of facilitation by primes related only in name. The results were interpreted to indicate that the individuals not showing name priming did not have sufficient time to extract the prime name code prior to target presentation. It was suggested that both groups employed similar automatic processes, which differed primarily in speed. In conclusion, considering the apparent unavoidability and inflexibility of target name processing, it was suggested that code isolability did not seem applicable to letter name and shape representations.

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Introduction

Early theories of attention frequently focussed on the stage in processing at which selection occurred (e.g., Broadbent, 1958; Treisman, 1964; Norman, 1968; Deutsch & Deutsch, 1963). More recently a number of reconceptualizations of attention have been proposed that are less dependent on the idea of locus of selection. The attentional resources (Norman & Bobrow, 1975) or effort (Kahneman, 1973) required to perform a task were assumed to determine how many activities could be performed simultaneously. The amount of resources required for a task was often synonymous with intuitive ideas of task difficulty. However, some apparently complex tasks did not appear to interfere much with other tasks, suggesting that they did not require many attentional resources. A common feature of such tasks is that they were well practiced.

Several writers draw a distinction between activities that appear to require attention and activities that appear to be automatic (LaBerge, 1975; Neisser, 1967). The two theories to be considered here are those of Shiffrin and Schneider (1977) and Posner and Snyder (1975a,b).

Shiffrin and Schneider (1977) distinguish between two types of processes. Controlled processing is described as slow and limited in capacity while automatic processing is rapid and unlimited in capacity. In developing this theory, Shiffrin and Schneider (1977) employed a visual search

paradigm and measured the rate at which people could search accurately. The relationship between accuracy and the number of items to be searched for on any trial (memory set size) was examined. When the relationship between potential memory set items and potential distractors was such that letters appearing as memory set items on some trials also appeared as distractors on others, the rate of search was slow and directly related to memory set size. When the potential memory set items never appeared as distractors search rate was directly related to memory set size at first, but after much practice search rate became very rapid and independent of memory set size.

Shiffrin and Schneider proposed that people had developed automatic detection responses to potential memory set items. Shiffrin and Schneider also demonstrated that performance became extremely poor when the memory and distractor categories were reversed. People reported that it was impossible to ignore the previously relevant items and Shiffrin and Schneider suggest that in such situations people may resort to conscious checking after any automatic processing. Shiffrin and Schneider emphasize that controlled processing is slow but flexible. Automatic processing is rapid and independent of memory load, but is very inflexible. Strategies and intentions have virtually no effect on established automatic sequences, and the unlearning of such sequences may take longer than their initial establishment.

Posner and Snyder's (1975a,b) distinction between conscious and automatic processes has many features in common with the Shiffrin and Schneider (1977) formulation, although there are important differences in emphasis. Posner and Snyder developed their theory from experiments employing a priming paradigm. In the most important demonstration, a letter matching task was employed and response time was measured. A letter prime preceded each trial, and the validity of the prime, or proportion of trials on which the prime was related to the target, was varied between conditions in order to manipulate the amount of conscious attention people devoted to the prime. Reduction of response time by prime presentation is assumed to occur as a result of commonalities between the representations activated by the prime and the target. The prime provides or activates some of the information used in target processing. This aspect of priming is generally considered to be similar whether or not conscious attention is devoted to the prime. Posner and Snyder found distinctly different patterns of results for the high and low prime validity conditions. In the high validity condition response times following relevant primes were reduced relative to a neutral prime condition (benefit) at all but the 10 msec prime-target interval. Response times for targets preceded by irrelevant primes were similar to response times following neutral primes at prime target intervals less than 300 msec. At longer prime-target intervals, irrelevant primes slowed

responses relative to the neutral prime condition (cost). In the low validity condition, related primes still facilitated responses, though to a lesser extent than in the high validity condition. Irrelevant primes did not slow responding relative to a neutral plus prime condition.

Posner and Snyder propose that two types of processes are implicated. The first is automatic processing, which is fast acting and unlimited in capacity. In a low validity prime condition facilitation of primes is assumed to be the result of fast prime processing. The unlimited capacity of automatic processing is assumed to account for the absence of cost when the prime is irrelevant. The second type of processing is conscious attentional processing, which is limited in capacity and relatively slow acting. It is assumed to produce the results found in a high validity prime condition. The facilitation produced by relevant primes is larger when they are attended than when they are automatically processed. The application of limited capacity conscious attention is assumed to result in an inhibition of the processing of irrelevant material, which explains the cost produced by irrelevant primes in a high validity condition.

The emphasis in both theories (Posner & Snyder, 1975a,b; Shiffrin & Schneider, 1977) is on the rapidity and unlimited capacity of automatic processing and on the slowness and limited capacity of conscious processing. Both

theories of conscious or controlled and automatic processes appear to assume that the two processes could be applicable to any type of material. Both of the experiments described used letter stimuli, and the extraction of physical features would have been sufficient for either task. However, both theories are considered to be generalizable to much more complex classes of stimuli. Shiffrin and Schneider also describe the automatic detection of digits among letters, and Posner and Snyder describe word matching tasks which support their two process model. Neely (1977) employed a lexical decision task with semantic category primes in an experiment that strongly supports Posner and Snyder's view of conscious and automatic processing.

Posner has been a strong advocate of the idea that any stimulus may have a number of possible mental representations. A typical instance of a stimulus with alternate codes is a letter. There have been many demonstrations of differences between the physical or shape code of a letter, and its phonemic or name code. Posner's (1968) finding that people could match letters faster when given instructions to match on the basis of physical identity than when instructed to match on the basis of name identity was originally considered to support a processing model in which simple physical codes were extracted prior to more complex codes. However later evidence suggested that the order of processing or of code extraction is not invariant. As an example, Posner (1978) proposed that the

effect of inverting a letter was to delay access to the physical code without affecting the time at which the name code is available. This exemplifies Posner's contention that name and physical codes are independently accessible or isolable. The concept of isolability was operationalized by stating that the time courses of isolable codes can be manipulated independently. In support of the isolability concept, Posner cited the finding that people can reject letter pairs which are identical in name but physically different as rapidly as they can decide that completely unrelated letters are different under physical match instructions. This indicates that name codes can be avoided or sufficiently delayed to prevent interference on a physical task, but it has been difficult to replicate this important result consistently (Anderson, 1975, cited in Posner, 1978; Petruk, 1980).

The relationship between isolability and automatic and conscious processing has not been examined. The issue to be considered here is the isolability of the name and physical codes for letters, i.e., whether name coding of letters can be avoided when a physical matching task is performed. The hypothesis advanced here is that once letter name extraction has become automatic (presumably the case for literate adults), it is unavoidable. It is proposed that processing cannot be terminated and a decision made prior to the availability of a name code. The question is whether isolability is a term usefully applied to codes, such as

those of letters, which form a sequence or automatically activate each other.

The study reported here utilizes a priming paradigm. Priming is especially useful in that it can be used to determine the codes affecting target processing (e.g., Warren, 1975) in addition to distinguishing conscious from automatic processing (Posner & Snyder, 1975; Neely, 1977).

In the study described here, an attempt was made to examine the isolability concept. A physical identity letter matching task was employed, but priming provided the means to evaluate the extent to which name codes were accessed. The primes presented on trials requiring Same responses were of four types. Thirty per cent of the primes were physically identical to the target letters, 30% shared the same name but were of the opposite case to the target pair, 20% were neutral plus (+) primes, and 20% were unrelated letter primes. Corresponding prime types were presented on trials requiring a Different responses. One approach to the isolability hypothesis is to assume that it implies that the time course of physical and name codes can be manipulated in such a way that only one code is activated rapidly enough to produce effects on responding. If this is an accurate interpretation of the isolability hypothesis, and physical codes alone were employed in the decision processes relevant to each target pair, facilitation relative to the plus prime condition should only occur on trials preceded by physically

identical primes. Name related primes should have no effect since the name code of the target need not be accessed to perform a physical match, even if the prime had previously activated its name code.

Only 30% of the primes were physically identical to the targets, thus as in Posner and Snyder's (1975b) low validity prime condition, only automatic prime processing should occur. However, if name codes were employed in the present task, 60% of primes and targets would be related, and conscious name processing could be expected.

To test the conditions under which automatic name processing will occur, the experimental task was designed to make name processing detrimental to rapid and accurate responding. The critical items introduced for this purpose were target pairs in which the two letters shared the same name but were of opposite case. In a physical matching task the appropriate response to these Same-Name Different Case pairs is Different. Name processing would be disadvantageous to rapid and accurate responding to these items, because the information that the two letters shared the same name might lead to a tendency to respond Same. If only physical codes were employed, the conflicting response problem would never arise, and responses to Same-Name Different Case trials would be no slower than responses to Different Name Different Case trials.

If name and physical codes are isolable and if a

physical processing strategy is adopted in the present task, name related primes should produce no facilitatory effects. Since the occurrence of Same-Name Different trials was unpredictable, there was no way of knowing if name processing would be counterproductive for a particular target pair. Hence, the development or use of a consistent strategy appears to be necessary. In short, if there is to be no interference from name information on Same-Name Different trials, there can be no facilitation on name primed Same trials.

Quite different effects would be anticipated if the processing of physical and name information is automatic in the sense described by Shiffrin and Schneider (1977). The processing of name information would be unavoidable, but its rate could be affected by situational variables such as the presence of a prime. If name related primes speed name processing, faciliation should be present on Same trials preceded by name related primes. However, the unpredictable occurrence of Same-Name Different trials should result in interference if target name processing is unavoidable.

An additional hypothesis concerned the effects of the frequency of Same-Name Different trials on the magnitude of priming on Same trials. It has been found previously that manipulations which slow target processing frequently enhance the magnitude of priming effects (Meyer & Schvaneveldeldt,75). It is postulated that if name

processing is unavoidable, increasing the frequency of Same-Name Different trials would increase the difficulty of the physical matching task, and could result in a slowing of responses to maintain accuracy. If this slowing occured it would allow more time for prime information to produce activation, and enlarge the priming effects at short prime-target SOAs (stimulus onset asynchrony). Frequency of Same-Name Different trials was manipulated both within and between subjects to assess this possibility.

Experiment 1

Method

Design and Materials. The target pairs were physically identical on nearly half of the trials (49.5%) and required Same responses. The remaining trials required Different responses. On all trials a prime appeared prior to the target pair. There were four types of prime. On 30% of all trials the prime was physically identical to one or both of the target letters, and on 30% the prime was of opposite case but had the same name as one or both of the target letters. On 20% of the Same trials and 40% of the Different trials a neutral plus sign (+) cue was presented. On the remaining 20% of Same trials the prime was a letter unrelated to either target letter. The probability of an unrelated prime being of same or opposite case to the target pair was equal.

Each observer saw four blocks of 202 trials excluding the practice trials. The first block was a control condition block during which the prime-target SOA was 300 msec for all subjects. During the second block the prime-target SOA was also always 300 msec. The SOAs for the last two blocks were 75 and 25 msec, with these two SOA orders counterbalanced across subjects. All factors described thus far were within subject variables and completely crossed with each other and with the between-subjects variable.

The only between-subjects variable was the proportion

of trials on which the target letters shared the same name but were of opposite case. Under the physical match instructions given in this experiment, the correct response to these Same-Name Different trials was Different. One half of the subjects were randomly assigned to each of two conditions. The Control condition never received any Same-Name Different trials. For this condition, one half of the Different trials were of different name and case, and one third were of different name but same case. The remaining one sixth of trials in the control condition blocks were originally intended to be of different name and case, however, due to a programming error, an upper case pair was always presented, and one member of the pair was always an upper case R. These trials were not used in computing condition and subject medians. There was no reason to predict any systematic effect of this error, nor was there any evidence to support a systematic effect, so the error is not considered further.

The first block of trials for the Same-Name Different Condition were identical to those of the Control condition. The Same-Name Different trials were introduced on the second block of trials and maintained in the third and fourth blocks. This altered the grouping of Different trials to be one-third same name and different case, one third different name and case, and one third different name and same case.

All letters were plotted on an HP 1304A CRT equipped

with P15 fast decay phosphor. Each letter subtended a maximum visual angle of .38 degrees horizontally and .38 degrees vertically. The letters shown were from the set consisting of BCDFGHJMNR and the corresponding lower case letters. Primes were centred .20 degrees above the fixation point and the target pairs were centred .20 degrees below the fixation point. The screen was viewed through a tunnel 75 cm. (26.7 in) in length. An HP9825A computer and HP1350A graphics translator controlled trial randomization and presentation, and recorded response times. The controlling program is presented in Appendix D.

Subjects Forty seven people volunteered to serve in the experiment. They received either course credit or four dollars for their participation. The native language of 13 of the volunteers was not English and their data were excluded from the analysis. It was assumed that they did not have the same familiarity with the Roman alphabet as did the native speakers of English. Data from two people were discarded because their overall error rate exceeded ten percent. The remaining data, collected from 18 females and 14 males, were analyzed.

Procedure Each trial consisted of a prime (a letter or a plus sign) which appeared for 15 msec immediately after the observer initiated a trial. After a variable interval following the prime, the target pair of letters appeared. The observer decided if the pair were physically identical or not (Same or Different). Response time from target onset and accuracy were recorded. A fixation point acted as a ready signal, indicating that a new trial could be initiated.

Subjects were told that the experiment was about visual information processing and asked to judge whether pairs of letters were identical. The use of the levers for starting each trial and for making Same and Different responses was described. The trial initiation lever was operated by the index finger of the left hand. The Same and Different response buttons were operated by the index and middle fingers of the right hand. For half of the subjects, Same responses were made with the index finger, and Different responses with the middle finger and for the remainder the finger-response relationship was reversed.

The instructions emphasized responding strictly on the basis of physical features. Regardless of the condition to which they had been assigned, they were alerted to the possibility of pairs having the same name and different case and told that the appropriate response to these pairs was Different. Subjects were told to treat the primes as cues or

warning signals for the same-different task. Observers were not told which condition they were in nor were they informed about the relationships between primes and targets. Finally, subjects were instructed to respond as quickly as possible without errors and told to be more careful if they found they made errors. Following these instructions the subject was seated in front of the viewing tunnel before beginning the practice trials and the four subsequent blocks. The first block was preceded by forty practice trials that included at least two of each type of prime target relation presented. Each of the remaining three blocks was preceded by twenty practice trials, with at least one of each pair type presented. Subjects were tested individually, and the total testing time was approximately 50 minutes. There was a short break after the second group of 202 trials. After completing all trials, each participant was told the purpose of the experiment.

Results

The median response time for each condition and subject was calculated and served as the response measure in analysis of variance. The Different trials which were incorrectly presented were not included in the analysis, nor were trials on which errors were made.

Analysis of Same Responses : The median Same responses were analyzed in a 4(SOA) by 4(Prime Type) by 2(Group) by 16(Subjects) analysis of variance. The four levels of the SOA variable corresponded to the four blocks of trials;the initial control block at an SOA of 300 msec, and the subsequent sets of SOAs of 300, 75, and 25 msec. The four types of prime-target relationships were, physically related primes, name related primes, plus primes, and unrelated letter primes. Both SOA and Prime Type factors were within subjects factors and treated as fixed variables. Group was a fixed between subjects variable. The two groups were distinguished by whether or not they were presented with Same-Name Different trials (e.g., Bb).

The prime types led to differential performance, $F(3,90)=24.46$, $p < .01$. A Duncan multiple range test (MS error=745.24, 90 df) at the .05 level of significance indicated that physically primed trials were significantly faster than all other types, and trials preceded by unrelated letter primes were significantly slower than all other types. Name primed trials did not differ significantly from trials preceded by a plus prime. The Prime type means are presented in Table 1.

A significant effect of SOA was also obtained, $F(3,90)=6.73$; $p <.01$. Response time decreased from the first to second 300 msec block probably as a result of practice. Responding was fastest at the 75 msec SOA and slower at the

very brief 25 msec SOA. The means for each block are shown in Table 2, together with the SOA means for Different and Same-Name Different responses.

The only other reliable effect found was an SOA by Prime Type interaction, F (19,270)=6.14; p <.01, which is presented in Table 1. A Duncan multiple range test (MS error=770.2, 270 df) indicated that in the first 300 msec block physically primed trials were reliably faster than all other types. Name primed trials were significantly faster than plus and unrelated prime trials which did not differ appreciably. In the second 300 msec block, responses to physically primed trials were again reliably faster than responses to other types. Name and plus prime means did not differ significantly. Responses on unrelated prime trials were significantly slower than responses on name and plus prime trials. At the 75 msec SOA, only the mean response times to trials preceded by physical and unrelated primes differed reliably. There were no significant effects of prime type at the 25 msec SOA. The presence or absence of Same-Name Different trials did not affect performance on Same trials, F (1,30)=.18, nor did it interact significantly with any other variable (smallest p =.45).

Prime Type differentially affected error rate, F (3,90)=3.08; p <.05. The mean error rates for Physical, Name, Plus, and Unrelated prime types were 2.6, 3.8, 3.0, and 3.9 % respectively. No other factors had a significant

effect on error rate.

To provide a more sensitive test of the effects of the presence of Same-Name Different trials, an analysis of Same responses in the two 300 msec blocks was performed. One group was presented the same type of items in both 300 msec SOA blocks, and these did not include Same-Name Different trials. The other group received Same-Name Different items in the second block. The effects of introducing Same-Name Different trials should be reflected in a Group by Block interaction. The other factors in this analysis were Prime Type and Subjects.

The results of this analysis mirrored the analysis of all Same responses. The effect of Prime Type was reliable, $F_{(3,90)}=23.78$; $p<.01$, as was the Block effect, $F_{(1,30)}=10.12$, $p<.01$. The Block by Prime Type effect was also significant, $F_{(3,90)}=3.06$; $p<.01$. No reliable effects were found in the analysis of error rates for the first two blocks.

The Group by Block interaction was not reliable, $F_{(1,30)}=.55$. This indicates that the introduction of Same-Name Different trials had little or no effect on responding to Same items. As in the first analysis, Group membership did not interact significantly with any other variables nor was there a Group main effect (smallest $p=.46$).

Analysis of Different Responses In the analysis of median Different response times, the within subjects factors were Prime Type, Target case, and SOA. The Prime Type factor had only three levels since there were no unrelated letter primes on trials requiring a Different response. The Target Case factor had two levels, one in which targets were different but were both capital or both small letters (Same Case), and another in which the letters of the target differed in case as well as in name (Different Case). Trials with targets of same name but different case (Same-Name Different) were considered in a separate analysis to be discussed later. The SOA factor had four levels; the two 300 msec blocks, and the 75 and 25 msec SOAs, where SOA, Prime Type, and Target Case were fixed variables. Group membership was a fixed between subjects factor and subjects were treated as a random factor.

The SOA effect was significant, F (3,90)=20.87; p <.01, and was similar to that for Same responses. The means are presented in Table 2. Different case targets led to more rapid responding than was obtained for same case targets, F (1,30)=42.01; p <.01. The means for different case trials and same case trials were 570 and 595 msec respectively. The presence of Same-Name Different trials had no significant effect, nor did the Group variable interact significantly with any other.

In the analysis of error rates, a significant effect of

Target Case was found, $F\ (1,30)=18.6$; $p < .01$. The error rates for Same Case and Different Case different trials were 3.2%and .5% respectively. The Group by Target Case interaction was significant, $F\ (1,30)=5.18$; $p < .05$. The mean error rate and direction of effects were similar for both groups, but the group which received Same-Name Different trials showed a greater difference in errors between same case and different case trials.

An analysis including only the two 300 msec blocks was undertaken to assess the effects of adding Same-Name Different trials on overall responding to Different trials. In this analysis, responses to Same-Name Different trials were again excluded and all other factors were as in the previous Different response analysis. The effects corresponded to those reported above. There was a significant Case effect, $F\ (1,30)=34.66$; $p < .01$, and a significant SOA effect, $F\ (1,30)=25.53$; $p < .01$, which is probably a practice effect. The introduction of Same-Name Different trials did not affect performance on the other classes of Different trials, $F\ (1,30)=.02$, nor did it interact reliably with other variables (smallest $p = .06$, Group by SOA by Prime Type).

Analysis of Same-Name Different Responses Trials with targets having the same name but of different case were compared to appropriate controls to determine whether they were more difficult to respond to than physically different items not bearing the same name. Since only one group saw Same-Name Different trials, Group was not a factor in this analysis. The within subject factors were SOA and Trial Type. There were three levels of SOA corresponding to the second, third, and fourth trial blocks; 300 msec, 75 msec, and 25 msec. The four trial types were as follows; same case different trials preceded by a plus prime (+ BD), different case and different name trials preceded by a plus prime (+ Bd), same name and different case targets preceded by a plus prime (+ Bb), and same name and different case targets preceded by a related prime (B Bb).

The only reliable effect was produced by the Trial Type variable, F (3,45)=7.58; p <.01. The means are presented in Table 3. A Duncan's multiple range test (MS error=2409.6, 45 df) at the .05 level of significance showed that different case and different name trials (+ Bd) were significantly faster than same case different trials, and same case different trials were significantly faster than both types of Same-Name Different trials (+ Bb, B Bb). The means are presented in Table 3. Same-Name Different trials preceded by a plus prime took an average of 43 msec longer than different case and different name trials. Fourteen of sixteen people were slower on Same-Name Different trials

than on different name and different case trials. One person was equally fast on the two trial types and one was 5 msec faster on the Same-Name Different trials. This pattern of results fails to replicate Posner's (1969) finding that Same-Name Different Case trials are not slower than Different Name Different trials under physical matching instructions, and indicates that name processing of the target was occurring.

Discussion

The introduction of Same-Name Different trials failed to have any effect on performance on other types of trials. The Same-Name Different trials were difficult, but apparently did not lead to the adoption of any general strategy or process for attempting to avoid name processing on other types of trials. Since the performance on Same trials and on Different Name Different trials of those who saw Same-Name Different trials did not differ from those who did not, it is probable that both groups were using the same processes in the task.

The Prime effect indicates that physical primes facilitated responding because of physical identity and not simply name identity. However, name identity seemed to be having some effect since name related and unrelated primes differed reliably.

The SOA effects were a combination of practice and warning effects. Performance improved over the two 300 msec

blocks, and was fastest for the 75 msec block. The 25 msec prime-target interval resulted in slower performance, probably because it is too short to be an optimal warning interval.

The SOA by Prime interaction provides some insight into the type of prime processing utilized. Although the physical priming effect increases with SOA and is not reliable at prime-target SOAs less than 300 msec, the priming effects may appear to fit the typical conscious processing pattern described by Posner and Snyder (1975a,b). According to their model of conscious processing there should be no costs for unrelated primes at short SOAs, but at an SOA between 150 and 300 msec, large costs should appear. The present data show a significant cost, which was primarily a result of a significant cost which only occurred in the second 300 msec block. Since some priming trends began to appear at 75 msec, it may be reasonable to class the physical priming as fast and automatic, even though some cost is present.

The effect of target case indicated that some physical features affected Different response times. However the advantage for different case target pairs was not evident for Same-Name Different Case targets. Name information appeared to be available prior to the execution of a Different response based on physical characteristics such as case; if it were not available, Same-Name Different Case trials (Bb) should have been equivalent to different name

different case trials (Bc). Name processing seemed to be occurring even though subjects attempted to follow instructions and did respond in accordance with the physical identity instructions.

Experiment 2

Because of the strong effect of target case on Different response times, it may be that case is an important variable in prime-target relationships on Same trials. Perhaps targets of different case than the prime could be processed differently from target letters of the same case as the prime. Such a change in processing might lead to reduced priming effects, with the prime rendered effectively neutral when it differed in case from the targets, regardless of the nominal prime-target relation. If this were so it is possible that Same trials preceded by unrelated primes of different case than the target (a BB) would not differ significantly from Same trials preceded by name related but opposite case primes (b BB).

Unfortunately, although the probability of an unrelated prime matching or not matching the target case was equal, this relationship was not recorded and the two types of unrelated prime trials were not separable. To test the alternate hypothesis about name priming an experiment similar to the first was performed. The two types of unrelated primes were separately recorded.

Method

The design differed from that of Experiment 1 in only a few particulars. Instead of four types of primes, five types were analysed. Thirty percent of primes were physically identical to one or both targets, and 30% were of opposite case but had the same name as one or both targets. Forty percent of Different trials and 20% of Same trials were preceded by plus primes. On 10% of Same trials the prime was unrelated to the targets but of the same case, and on 10% the prime was unrelated to the targets and of the opposite case.

The same 300 msec SOA was presented for all four blocks, and all subjects were in the Control condition, where no Same-Name Different trials were presented. Four people, three males and one female, were paid four dollars for their participation in the experiment. Except as noted in the Design, the procedure was identical to Experiment 1.

Results

The priming results for Same responses closely replicated those of the original experiment at an SOA of 300 msec. An analysis of variance was performed with two within subjects factors, Prime Type and Block. The Prime Type variable had five levels, Physical Prime, Name Prime, Plus Prime, Unrelated Different Case Prime, and Unrelated Same Case Prime. The four levels of the Block factor corresponded to the four successive blocks of trials at a 300 msec prime-

target SOA.

There was a significant effect of Block, F (3,9)=5.02; p <.05. The Prime effect was also significant, F (4,12)=8.93; p <.01, and a Duncan multiple range test (MS error=1901.2, 12 df) at the .05 level of significance indicated that physically primed trials were significantly faster than all other trial types. Name trials did not differ from plus prime trials, but did differ from both types of unrelated prime trials. The mean RTs for each prime type are presented in Table 4.

An analysis of Different responses of the four people in the replication study produced only one statistically reliable effect, a Block by Prime interaction, F (6,18)=4.36; p <.01. Since this effect does not appear to be explicable or relevant to the main issues of the experiment, the analysis is presented in Appendix A and the data are presented in Appendix B but the interaction will not be discussed further.

Discussion

Priming effects were not eliminated when the prime and target differed in case. Even though the name primes do not appear to facilitate processing relative to the plus prime condition, the name commonality between prime and target obviously has some effect. Otherwise, primes related only in name should produce the same effects as other physically unrelated primes.

The most striking effect of the second experiment was not related to the original purpose of the experiment, nor does it appear in the analyses shown above. All four people showed consistent physical priming for Same responses, but there appeared to be large individual differences in name priming. Two people showed substantial name priming relative to the plus prime condition and were assigned to the Name Priming Present Group. The other two people were slower on name prime trials than on plus prime trials, and their performance on name prime trials appeared similar to their performance on unrelated prime trials. They were assigned to the Name Priming Absent Group. In the analysis reported in the preceding section, these name priming effects were combined, resulting in the appearance that name priming had effects similar to those of plus primes.

The data from Experiment 2 were reanalysed, using the same factors as in the previous analysis. but with the addition of the Name Priming Group factor. The analysis of Same responses produced similar effects to the earlier analysis. There was a significant block effect, F $(3,6)=6.37$; $p < .05$, and a significant Prime Type effect, F $(4,8)=29.89$; $p < .01$. In addition, The Name Priming Group by Prime Type interaction was significant, F $(4,8)=8.04$; p $< .01$. The means are presented in Table 5. The basis for selection, must, of course, produce mean differences. This analysis simply shows that this difference is statistically

reliable. There may be reason to extend this analysis to the results of the preceding experiment. Individual differences in name priming may account for the lack of facilitation or cost for name primes found in the first experiment.

The analysis of Different responses with the addition of the Name Priming Group factor provided only one reliable result; the same Block by Prime effect, $F(6,18)=8.72$; $p < .01$, that had been found in the earlier analysis of Different responses from the second experiment.

Reanalysis of Experiment 1

On the basis of the apparent importance of individual differences in name priming, subjects in Experiment 1 were divided into groups according to whether or not they showed name priming in the second 300 msec SOA block. Eight of the sixteen people in the group shown Same-Name Different trials and eight of the sixteen in the group not shown Same-Name Different trials showed 8 msec or more of name priming in the second 300 msec SOA block. These people were assigned to the Name Priming Present Group and the remainder were assigned to the Name Priming Absent Group. This resulted in two crossed between subjects factors.

If there are no consistent differences between individuals correlated with the presence of name priming in the second 300 msec block, then the Name Priming Groups factor based on this selection should have no consistent or predictable effects. On the other hand, if there are differences between people in name priming, then those selected for showing name priming in one 300 msec block will tend to show it in the other. The groups may also differ consistently at other SOAs. Interactions suggesting the processing differences responsible for name priming may also be found.

Results

Analysis of same responses. As in the initial analysis of Same resonses the Prime Type, F (3,84)=29.13; p <.01, SOA, F (3,84)=7.82; p <.01, and SOA by Prime, F (9,252)=6.71; p <.01, effects were significant. The Name Priming Group factor interacted reliably with a number of other variables. The Name Priming Group by Prime interaction was significant, F (3,84)=6.37; p <.01, and showed that people selected for name priming during the second 300 msec block tended to show overall name priming on Same responses. As shown in Table 6, a Duncan multiple range test (MS error=625.72, 84 df) at the .05 level of significance yielded different priming effects for the two groups. In the Name Priming Present Group, physically primed Same trials were significantly faster than plus prime trials. The overall pattern of priming for those not showing name priming during the second 300 msec block is markedly different. Physically primed trials were significantly faster than all other Same trials, and plus, name, and unrelated prime trials did not differ from each other.

Although selection did produce some of the effects described above, the division appears to be reflecting a generalizable difference in prime processing, as Name Prime Group enters into another significant interaction, Name Prime Group by Block by Prime Type, F (9,252)=3.18; p <.01. The interaction is presented in Table 7. A Duncan's multiple

range test (MS error=710.59, 252 df) at the .05 level of significance was performed to determine the important aspects of the interaction. The interaction appears to be partially the result of a difference in priming at the 75 msec SOA. The Name Priming Present Group shows some physical priming at 75 msec while the Name Priming Absent Group shows minimal differences between prime types at that SOA. In addition the Name Priming Present Group tends to show greater physical priming than the Name Priming Absent Group at all SOAs except 25 msec. The last point of interest in this interaction is the finding that at the 25 msec SOA the Name Priming Present Group is fastest when a plus prime precedes the trial, wheras the Name Priming Absent Group does not show any apparent differences between prime types at this SOA. The nature of the interaction suggests that people in the Name Priming Present Group may process the primes more thoroughly or consistently and thus show larger priming effects at shorter SOAs. People in the Name Priming Present Group do not appear to show the large costs indicative of conscious or controlled processing. The short SOA at which priming becomes evident in the Name Priming Present group also argue against an explanation of priming differences that assumes conscious processing. There is a tendency for the Name Priming Present Group to be faster overall, F (1,28)=2.99, p =.095. Although not reliable this difference is consistent across prime types with the Name Priming Present Group 46 msec faster than the Name Priming

Absent Group on plus prime trials. This, combined with the Name Priming Group by Block by Prime Type interaction seems to indicate that people in the Name Priming Present Group are able to process prime and target information more quickly than those assigned to the Name Priming Absent Group.

The error rate analysis produced two reliable results. As in the Same trial analysis, the Prime Type effect on error rate was significant, F $(3,84)=3.01$; $p<.05$. There was also an uninterpretable Same-Name Different Trials Group by Name Priming Group by Block by Prime Type interaction, F $(9,252)=2.44$; $p<.05$.

Analysis of Same-Name Different responses. A reanalysis of the Same-Name Different data was performed including the Name Priming Group factor. The within subjects factors were Trial Type and SOA. The only significant effect was of Trial Type, F $(3,42)=7.67$; $p<.01$. The Name Priming Group by Trial Type interaction was not significant, F $(6,84)=1.15$; $p=.340$. All eight people in the Name Priming Absent Group had longer median RTs for Same-Name Different trials preceded by plus primes (+ Bb) than for different case and different name targets preceded by plus primes (+ Bd).

Discussion

The division of individuals on the basis of name priming magnitude in one SOA block appears to reflect more general differences between people. Although a tendency for the Name Priming Present Group to be slow in responding to plus prime trials could have resulted in their selection for name priming, and produced inflated estimates of physical priming, this is an unlikely explanation for two reasons. The first is that the effects are present in blocks other than the one on which selection was based. Secondly, the Name Priming Present Group show a reliable cost for unrelated letter primes when all SOAs are combined, and the Name Priming Absent Group do not. This would not be expected if the Name Priming Present group were just slow on trials preceded by plus primes.

The Name Priming Group by SOA by Prime Type interaction is largely a result of the Name Priming Present group showing more priming effects, and showing them at briefer SOAs. People in the Name Priming Present group may be processing prime information more thoroughly or consistently than the other group. Although a significant cost for unrelated primes was found for the Name Priming Present group (See Table 6), the cost is small and not statistically reliable at any SOAs and does not fit the Posner and Snyder (1975a,b) conscious processing pattern. The tendency for the Name Priming Present group to be faster overall in

responding may indicate that members of the Name Priming Present group were faster at processing letter information. This would not imply that the processes used by the two groups differed qualitatively. One problem with this explanation, however, is the significant cost found on Name and Unrelated prime trials for the Name Priming Absent Group in the second 300 msec block. Since no physical priming occuers at this SOA for the Name Priming Absent Group, the findings do not fit automatic or conscious processing models of prime processing.

The results for Same-Name Different trials support the argument that both the Name Priming Present and Name Priming Absent Groups used similar processes. In particular, name information appeared to affect the processing of Different targets regardless of differences in prime processing.

General Discussion

This study employed a letter matching task with instructions to match on the basis of physical identity. The main conclusions were that people could control neither the codes activated nor the time courses of activation sufficiently to prevent interference resulting from the availability of name information.

Reaction times on same-name different case trials were slow, suggesting that people were unable to adopt a strategy for avoiding name processing. However, even though response times to same-name different-case trials were long, and error rates elevated, the vast majority of responses on such trials were correct. This indicated that people could follow the instructions and respond on the basis of shape.

These findings can be reconciled by assuming that name processing was automatic and not subject to conscious control. On the other hand, it could be assumed that consciously controlled processing permitted a correct response on trials where the name and physical information led to contradictory decisions.

The types of information contributing to same and different responses are considered. It is theorized that the processing responsible for physical priming is automatic, and quite distinct from the processing required for decisions about shape identity.

An attempt was made to show that although there were large individual differences in priming effects, they do not affect the conclusions about target processing outlined above. In short, name processing of targets seems obligatory even if name processing of primes is not.

It is concluded that a code isolability hypothesis such as that proposed by Posner (1978) is not tenable if it requires that physical and name processing of letters be experimentally separable to the extent that only one code produces effects on responding. The results are more in agreement with the model of automatic and controlled processing proposed by Shiffrin and Schneider (1977).

Since Posner and Snyder's (1975b) finding that primes did not facilitate Different responses was replicated in the present study, the Different trials in this experiment will be considered as a simultaneous matching task, and only target processing will be discussed. There appear to be three types of information affecting response time to targets on Different trials. Name information is available prior to response on Different trials and may produce a decision about name identity. This is the source of the difficulties encountered on Same-Name Different Case trials under physical identity instructions.

Physical information contributes to a check for physical identity once name information has become

available. This permits correct decisions on Same-Name Different trials. The notion of a check for physical identity after the completion of name coding is unusual, but is readily testable. If name identity instructions are employed, no checking is required once a Same decision is reached. The usual finding that responses to pairs only identical in name are slower than responses to physically identical pairs should be obtained. If checking is required when physical identity instructions are used, and if checking adds something to RT even when the name and physical decisions do not conflict, the RTs to physically identical pairs should be longer under physical identity instructions than under name identity instructions. This finding would suggest that the physical identity checking was under conscious control, since it could be used if the task demanded it and not used otherwise.

A third type of information, probably crude physical information about dimensions such as size, amount of contour, and brightness, also affects response time. This is inferred from the finding that pairs of different name and different case were significantly faster than responses to pairs differing only in name. Two explanations of this effect will be considered. One explanation is that pairs differing in case are probably more easily encoded because they are more discriminable than letters of the same case. Physical discriminability has previously been assumed to account for the finding that response times to physically

similar pairs such as EF are slower than response times to dissimilar pairs on physical identity tasks (Posner, 1968). However, it must be inferred from the present data that this type of physical discriminability information can only reduce RT by speeding encoding. If responses could be made on the basis of case information alone, there should be no difficulty on Same-Name Different trials. This was clearly not the case.

In his studies of matching processes, Proctor (1980, in press) agrees that decisions are made at the name level on Different trials, and in many cases, on Same trials, regardless of task instructions. His data also supports the idea that physical identity acts only by speeding encoding of a stimulus, since the same shape is encoded twice. Extending this to physically different pairs is straightforward; it will take longer to determine that codes for two items must be accessed if the letters are not particularly discriminable.

An alternate explanation of the case effect is that part of the physical identity checking involves determining if the letters are of the same case. If they are of different case then a Different response is made. If they are of the same case then further checking might be needed. On Same-Name Different trials, the name will conflict with the case information, leading to slow RTs.

The present experiment does not provide a means of

deciding between these alternate explanations of the case effect. A name-identity task might resolve the problem. If the case effect results from a relatively early discrimination which can only facilitate or retard later processing, and does not form the basis for response, then it should still be present on Different trials in a name identity task. If the case effect is part of a physical check after name processing is complete, then the case effect may not be present in a name identity task since checking for physical identity is unnecessary and may not occur.

Since Posner and Snyder's (1975a,b) criteria for deciding if conscious or automatic processes are employed were developed using a priming paradigm, it is difficult to apply them to the results for Different trials. However if Shiffrin and Schneider's (1977) criteria are used, it can be assumed that those processes which cause difficulties because they are inflexible and unavoidable are automatic. This would imply that name processing of targets on Different trials is automatic. From the Different response data alone, it is not possible to decide if the early physical processing probably responsible for the case effect is automatic.

Same response trials on a physical match task do not provide information directly about the codes accessed. Priming, while usually having little systematic effect on

Different trials, permits inferences about the prime and target codes accessed and about the automaticity of prime processing.

The reasons for the marked individual differences in name priming are crucial in deciding whether name processing is obligatory when matching under physical identity instructions. The presence of name priming indicates that both the prime and target are processed to a sufficiently high level for prime name to influence target processing. The absence of name priming does not allow an unambiguous interpretation. The three alternative explanations to be considered are that neither the prime nor target are name processed, that only the target pair does not undergo name processing, or that only the prime fails to be name processed. The first two alternatives both imply that individuals not showing name priming fail to process Same targets to name level. There are two lines of evidence which do not support this position. First, as discussed previously, name processing of Different targets does appear to occur for all individuals, including those not showing name priming. Secondly, if people not showing name priming were able to make physical Same decisions about targets prior to name processing, their Same response times should be faster than the corresponding response times for individuals showing name priming. This was not found; the trend was in the opposite direction.

It is difficult to assume that individuals not showing name priming were doing less processing for Same than for Different responses, and that they were processing Same responses differently from individuals showing name priming. Target processing in the Name Priming Absent and Name Priming Present groups differed primarily with respect to the facilitatory effects of name and physically related primes, and appear to be the result of differences in prime processing rather than target processing.

Prime processing differs from target processing in that no response is required. In particular, prime processing may be truncated by the presentation of the target. Since subjects were instructed to respond as quickly as possible to the target, they should have switched attention to the target rather than attempt to complete prime processing. This effect was evident for all individuals at the 25 msec SOA; no priming occured because prime processing was not sufficiently advanced to provide information useful to target processing. In addition, for the Name Priming Present Group, interrupting the initial processing of letter primes resulted in poorer performance than for plus primes, suggesting a time consuming switch from one processing activity to another. This is not intended to imply that prime processing requires attention; it may be completely automatic and continue during target processing. The point of the argument is that at the time the target processing is occurring, prime processing is not far enough advanced to

facilitate target processing.

It could be the case that some individuals need more than 300 msec to extract the name code for a letter, even though it may be automatic. At the SOAs employed in the present study, such people would never show name priming, even if the targets were always processed to name level prior to response. An alternate explanation is that the Name Priming Absent Group failed to initiate any prime processing. This explanation is weakened by the significant overall physical priming effect found for the Name Priming Absent Group (See Table 6). The cost found for Name and Unrelated primes at the 300 msec SOA argues against both of these explanations of the performance of the Name Priming Absent Group, however, the results are not readily explicable in other theoretical terms.

Hunt, Lunneborg, and Lewis (1975) compared RTs to physically identical items and name identical items on a name match task and found that the difference in RT on the two pair types was related to verbal ability. They followed the reasoning of Posner et al (1968) in assuming that the difference in RT reflected time to extract the name codes necessary for a name identity match. In addition, they hypothesized that the individual differences found reflected differences in the speed of the overlearned transformation from shape to name, rather than differences in qualitative aspects of the processes employed.

It is proposed that the individual differences in name priming are of similar origin. If name priming is automatic, and its absence is due to a lack of prime processing time, then a larger proportion of individuals should show name priming if SOAs longer than those used in the present study are employed. It might also be expected that evidence of name priming at short SOAs will be associated with high verbal abilities.

The argument that physical identity matches are made using name codes appears to be inconsistent with Hunt, Lenneborg, and Lewis' (1975) use of the physical match task as a baseline for comparison of high and low verbal groups on a name match task. However, examination of their data (Table 1, pg. 202) shows that the mean for low verbals on the physical matching task was 18 msec slower than the mean for high verbals, and the means on the name matching task differed by 44 msec, in the same direction. It could be assumed that the difference on the physical identity task reflect time differences in performance of a single shape-to-name transformation, while the larger difference on the name match task reflect time differences in the performance of two shape-to-name transformations.

The present experiment and other studies (e.g., Proctor, in press) provide evidence that matching in a physical identity task is often not performed on the basis of physical information. The presence of name priming, even

though not evident for all individuals, is particularly important, as it suggests that name codes are employed even on simultaneous physical same trials (cf. Proctor). Much of the support for the isolability hypothesis relies on the name vs physical interpretation of matching tasks. Any suggestion that name processing is involved in physical match tasks demands reinterpretation of the role of a physical code.

It has been proposed that physical information may affect encoding, or that physical information may be used to check the results of name decisions. Neither of these interpretations are consistent with an isolability hypothesis.

Demonstrating that name information can be used in an ostensibly physical task is not a conclusive refutation of isolability; it could be argued that the task or instructions were not appropriate for inducing physical processing. However, a demonstration of an interaction between name and physical information is more damaging to an isolability or independent code hypothesis than a failure to eliminate name processing. In the present experiment, results for almost all trial types indicated that both name and physical information affected response time.

Under some circumstances, name codes make no contribution; a child or person not familiar with letter names could only use a physical code in a letter matching

task. At some point in learning about letters the physical information no longer serves as the sole basis of response in a physical identity task. Since people generally look at letters with the intent of reading them, and since, in Shiffrin and Schneider's (1977) terminology, letter names are quite consistently mapped onto shapes, letter naming can become automatic. It is proposed that once letter naming has become automatic, activation of name codes will be unavoidable. If this is the case, when one code for a stimulus automatically activates another, they will not be isolable. The concept of isolability may be useful when considering codes that do not have an overlearned connection but it does not appear to apply to typical letter shapes and names.

Table 1

Experiment 1:

The Interaction of Prime Target SOA and Prime Type on Same Response Times

	SOA (in msec)				
Prime Type	25	75	300(2)	300(1)	Mean
Physical	564(a)	524(a)	512(a)	555(a)	539(a)
Name	562(a)	534(ab)	549(b)	572(b)	554(b)
Plus	554(a)	537(ab)	555(b)	587(c)	558(b)
Unrelated	562(a)	544(b)	575(c)	589(c)	568(c)

Note. Duncan's multiple range test; Means within a column which share a common letter designation do not differ at the .05 level of significance.

Table 2

Experiment 1:

The Effect of Prime Target SOA on Response Times

	SOA (in msec)			
Target Type	25	75	300(2)	300(1)
Same	560	535	548	576
Different	571	550	580	629
Same-Name Different	594	566	594	---

Table 3

Experiment 1:

The Effect of Target type on Different Response Times Averaged over SOAs for the Same-Name Different Group

Target Type		
Different Case Different Name	(+ Bd)	544(a)
Same Case Different Name	(+ BD)	564(b)
Different Case Same Name Primed	(b Bb)	582(c)
Different Case Same Name	(+ Bb)	588(c)

Note. Duncan's multiple range test; Means which share a common letter designation do not differ at the .05 level of significance.

Table 4

Experiment 2:

The Effect of Prime Type on Same Response Times

Prime Type		
Physical	(B BB)	423(a)
Name	(b BB)	457(b)
Plus	(+ BB)	469(c)
Unrelated Different Case	(d BB)	493(d)
Unrelated Same Case	(D BB)	506(d)

Note. Duncan's multiple range test; Means which share a common letter designation do not differ at the .05 level of significance.

Table 5

Reanalysis of Experiment 2:

The Interaction of Prime Type and Name Priming Group

on Same Response Times

Prime Type		Name Priming Group: Absent	Present
Physical	(B BB)	480(a)	365(a)
Name	(b BB)	517(bc)	397(b)
Plus	(+ BB)	507(ab)	431(c)
Unrelated Different Case	(d BB)	512(b)	474(d)
Unrelated Same Case	(D BB)	542(c)	470(d)

Note. Duncan's multiple range test; Means within a column which share a common letter designation do not differ at the .05 level of significance.

Table 6

Reanalysis of Experiment 1:

The Interaction of Prime Type and Name Priming Group on Same Response Times Averaged over SOAs

	Name Priming Group	
Prime Type	Absent	Present
Physical	571(a)	506(a)
Name	588(b)	520(b)
Plus	582(b)	534(c)
Unrelated	591(b)	544(d)

Note. Duncan's multiple range test; Means within a column which share a common letter designation do not differ at the .05 level of significance.

Table 7

Reanalysis of Experiment 1:

The Interaction of SOA and Prime Type on Same Response Times in Name Priming Absent and Name Priming Present Groups

	SOA (in msec)			
Group	25	75	300(2)	300(1)
Name Priming Absent				
Prime Type				
Physical	577(a)	548(a)	554(a)	607(a)
Name	583(a)	553(a)	600(b)	616(a)
Plus	578(a)	555(a)	571(a)	624(a)
Unrelated	581(a)	557(a)	601(b)	625(a)
Name Priming Present				
Prime Type				
Physical	551(a)	501(a)	471(a)	503(a)
Name	541(ab)	515(ab)	498(b)	527(b)
Plus	529(b)	520(ab)	538(c)	550(c)
Unrelated	543(ab)	530(b)	549(c)	554(c)

Note. Duncan's multiple range test; Means within a column and group which share a common letter designation do not differ at the .05 level of significance. The underlined means are those on which Name Priming Group selection was based.

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Appendix A

Source Tables

1. EXPERIMENT 1

ANALYSIS OF SAME RESPONSE TIMES

SOURCE	ERROR	SUM SQUARES	DF	MEAN SQUARE	F	PROB
MEAN	S(G)	157514609.8	1	157514609.8	1097.09	0.0000
G	S(G)	26292.1	1	26292.1	0.18	0.6718
T	TS(G)	116939.4	3	38980.0	6.73	0.0004
P	PS(G)	54689.9	3	18230.0	24.46	0.0000
S(G)		4307254.9	30	143580.0		
GT	TS(G)	5197.3	3	1732.4	0.30	0.8259
GP	PS(G)	2006.3	3	668.7	0.90	0.4458
TP	S(G)	42920.4	9	4768.9	6.14	0.0000
TS(G)		521089.2	90	5789.9		
PS(G)		67071.6	90	745.2		
GTP	TPS(G)	2203.2	9	244.8	0.32	0.9697
TPS(G)		209794.8	270	777.0		

Note.

G refers to groups receiving or not receiving
Same-Name Different trials

T refers to the four levels of SOA

P refers to the four prime types

S refers to subjects

2. EXPERIMENT 1

ANALYSIS OF ERROR RATES , SAME TRIALS

SOURCE	ERROR	SUM SQUARES	DF	MEAN SQUARE	F	PROB
MEAN	S(G)	5733.9	1	5733.9	106.10	0.0000
G	S(G)	2.4	1	2.4	0.04	0.8348
T	TS(G)	73.1	3	24.4	1.63	0.1884
P	PS(G)	145.6	3	48.5	3.08	0.0313
S(G)		1621.3	30	54.0		
GT	TS(G)	43.2	3	14.4	0.96	0.4139
GP	PS(G)	32.1	3	10.7	0.68	0.5665
TP	TPS(G)	85.7	9	9.5	0.66	0.7478
TS(G)		1347.1	90	15.0		
PS(G)		1416.8	90	15.7		
GTP	TPS(G)	106.2	9	11.8	0.81	0.6036
TPS(G)		3913.2	270	14.5		

Note

G refers to groups receiving or not receiving
Same-Name Different trials

T refers to the four levels of SOA

P refers to the four prime types

S refers to subjects

3. EXPERIMENT 1

ANALYSIS OF SAME RESPONSE TIMES, 300 MSEC BLOCKS

SOURCE	ERROR	SUM SQUARES	DF	MEAN SQUARE	F	PROB
MEAN	S(G)	80765607.3	1	80765607.3	1058.91	0.0000
G	S(G)	18966.4	1	18966.4	0.25	0.6217
B	BS(G)	49770.8	1	49770.8	10.12	0.0034
P	PS(G)	82231.3	3	27410.0	23.78	0.0000
S(G)		2288182.6	30	76273.0		
GB	BS(G)	2720.3	1	2720.3	0.55	0.4629
GP	PS(G)	460.8	3	153.6	0.13	0.9400
BP	BPS(G)	7125.9	3	2375.3	3.06	0.0322
BS(G)		147572.5	30	4919.1		
PS(G)		103757.4	90	1152.9		
GBP	BPS(G)	179.3	3	59.8	0.08	0.9723
BPS(G)		69871.1	90	776.4		

Note.

G refers to groups receiving or not receiving
Same-Name Different trials

B refers to the two 300 msec SOA blocks

P refers to the four prime types

S refers to subjects

4. EXPERIMENT 1

ANALYSIS OF DIFFERENT RESPONSE TIMES

SOURCE	ERROR	SUM SQUARES	DF	MEAN SQUARE	F	PROB
MEAN	S(G)	260750000.0	1	260750000.0	884.34	0.0000
G	S(G)	21686.0	1	21686.0	0.07	0.7928
T	TS(G)	646980.0	3	215660.0	20.87	0.0000
C	CS(G)	117830.0	1	117830.0	42.01	0.0000
P	PS(G)	5755.5	2	2877.8	1.02	0.3676
S(G)		9264800.0	30	308830.0		
GT	TS(G)	20416.0	3	6805.4	0.66	0.5797
GC	CS(G)	210.4	1	210.4	0.08	0.7860
TC	TCS(G)	9843.0	3	3281.0	1.90	0.1352
GP	PS(G)	12129.0	2	6064.3	2.14	0.1260
TP	TPS(G)	34514.0	6	5752.3	2.37	0.0317
CP	CPS(G)	3298.9	2	1649.4	0.69	0.5068
TS(G)		930160.0	90	10335.0		
CS(G)		84149.0	30	2805.0		
PS(G)		169680.0	60	2828.1		
GTC	TCS(G)	3947.1	3	1315.7	0.76	0.5182
GTP	TPS(G)	24563.0	6	4093.8	1.68	0.1271
GCP	CPS(G)	823.9	2	412.0	.17	0.8427
TCP	TCPS(G)	31798.0	6	5299.7	1.63	0.1423
TCS(G)		155360.0	90	1726.3		
TPS(G)		437370.0	180	2429.9		
CPS(G)		143980.0	60	2399.7		
GTCP	TCPS(G)	8847.7	6	1474.6	0.45	0.8426
TCPS(G)		586680.0	180	3259.3		

Note.

G refers to groups receiving or not receiving
Same-Name Different trials

C refers to Same and Different Case Different trial types

T refers to the four levels of SOA

P refers to the three prime types

S refers to subjects

5. EXPERIMENT 1

ANALYSIS OF ERROR RATES, DIFFERENT TRIALS

SOURCE	ERROR	SUM SQUARES	DF	MEAN SQUARE	F	PROB
MEAN	S(G)	4118.6	1	4118.6	41.61	0.0000
G	S(G)	27.3	1	27.3	0.28	0.6031
T	TS(G)	92.5	3	30.8	1.19	0.3176
C	CS(G)	551.3	1	551.3	18.60	0.0002
P	PS(G)	26.3	2	13.2	0.65	0.5275
S(G)		2969.6	30	99.0		
GT	TS(G)	54.5	3	18.2	0.70	0.5531
GC	CS(G)	153.6	1	153.6	5.18	0.0301
TC	TCS(G)	105.1	3	35.0	2.55	0.0608
GP	PS(G)	13.7	2	6.9	0.34	0.7152
TP	TPS(G)	179.5	6	29.9	1.32	0.2483
CP	CPS(G)	52.9	2	26.4	1.23	0.2992
TS(G)		2329.5	90	25.9		
CS(G)		889.4	30	29.6		
PS(G)		1222.4	60	20.4		
GTC	TCS(G)	32.8	3	10.9	0.80	0.4994
GTP	TPS(G)	43.1	6	7.2	0.32	0.9268
GCP	CPS(G)	0.8	2	0.4	0.02	0.9810
TCP	TCPS(G)	173.4	6	28.9	1.58	0.1563
TCS(G)		1237.3	90	13.7		
TPS(G)		4064.7	180	22.6		
CPS(G)		1288.2	60	21.5		
GCTP	TCPS(G)	64.7	6	10.8	0.59	0.7396
TCPS(G)		3299.8	180	18.3		

Note.

G refers to groups receiving or not receiving
Same-Name Different trials

C refers to Same and Different Case different trial types

T refers to the four levels of SOA

P refers to the three prime types

S refers to subjects

6. EXPERIMENT 1

ANALYSIS OF DIFFERENT RESPONSES, BLOCKS 1 AND 2

SOURCE	ERROR	SUM SQUARES	DF	MEAN SQUARE	F	PROB
MEAN	S(G)	140370000.0	1	140370000.0	792.84	0.0000
G	S(G)	3099.7	1	3099.7	0.02	0.8956
B	BS(G)	236660.0	1	236660.0	25.53	0.0000
C	CS(G)	97378.0	1	97378.0	34.66	0.0000
P	PS(G)	20487.0	2	10243.0	2.47	0.0935
S(G)		5311400.0	30	5311400.0		
GB	BS(G)	15088.0	1	15088.0	1.63	0.2119
GC	CS(G)	4.8	1	4.8	0.00	0.9673
BC	BCS(G)	223.6	1	223.6	0.08	0.7730
GP	SP(G)	14093.0	2	14093.0	1.70	0.1920
BP	BPS(G)	6076.9	2	3038.4	1.10	0.3406
CP	CPS(G)	21021.0	2	10510.0	2.42	0.0977
BS(G)		278130.0	30	9271.1		
CS(G)		84284.0	30	2809.5		
PS(G)		249250.0	60	4154.2		
GBC	BCS(G)	3450.0	1	3450.0	1.31	0.2619
GBP	BPS(G)	16313.0	2	8156.7	2.94	0.0603
GCP	CPS(G)	2362.7	2	1181.3	0.27	0.7629
BCP	BCPS(G)	6137.3	2	3068.6	0.60	0.5546
BCS(G)		79179.0	30	2639.3		
BPS(G)		166260.0	60	2771.0		
CPS(G)		260790.0	60	4346.5		
GBCP	BCPS(G)	2728.9	2	1364.4	0.26	0.7683
BCPS(G)		309240.0	60	5154.0		

Note.

G refers to groups receiving or not receiving
Same-Name Different trials

C refers to Same and Different Case Different trial types

B refers to the first and second 300 msec SOA blocks

P refers to the three prime types

S refers to subjects

7. EXPERIMENT 1

ANALYSIS OF SAME-NAME DIFFERENT RESPONSE TIMES

SOURCE	ERROR	SUM SQUARES	DF	MEAN SQUARE	F	PROB
MEAN	S	62278242.0	1	62278242.2	533.30	0.0000
T	TS	20803.0	2	10401.7	1.91	0.1652
S		1751699.0	15	116779.9		
C	CS	54795.0	3	18264.9	7.58	0.0003
TS		163093.0	30	5436.4		
TC	TCS	12236.0	6	2039.4	1.16	0.3338
CS		108430.0	45	2409.6		
TCS		157964.0	90	1755.2		

C refers to four types of Different trials, including Same-Name Different trials

T refers to the three levels of SOA

S refers to subjects

8. EXPERIMENT 2

ANALYSIS OF SAME RESPONSE TIMES

SOURCE	ERROR	SUM SQUARES	DF	MEAN SQUARE	F	PROB
MEAN	S	17647099.0	1	17647099.0	145.25	0.0012
S		364473.0	3	121491.1		
B	BS	25723.0	3	8574.3	5.02	0.0258
P	PS	67931.0	4	16982.8	8.93	0.0014
BS		15382.0	9	1709.1		
PS		22822.0	12	1901.8		
BP	BPS	10630.0	12	885.9	1.03	0.4409
BPS		30852.0	36	857.0		

Note.

B refers to the four blocks of trials

P refers to the five prime types

S refers to subjects

9. EXPERIMENT 2

ANALYSIS OF DIFFERENT RESPONSE TIMES

SOURCE	ERROR	SUM SQUARES	DF	MEAN SQUARE	F	PROB
MEAN	S	24479875.1	1	24479875.1	205.84	0.0007
S		356777.2	3	118925.7		
B	BS	6777.9	3	2259.3	1.97	0.1895
C	CS	4558.2	1	4558.2	9.61	0.0533
P	PS	249.3	2	124.6	0.14	0.8738
BS		10335.3	9	1148.4		
CS		1423.4	3	474.5		
BC	BCS	1782.6	3	594.2	1.60	0.2561
PS		5419.7	6	903.3		
BP	BPS	8337.0	6	1389.5	4.36	0.0069
CP	CPS	669.7	2	334.8	0.54	0.6110
BCS		3335.8	9	370.6		
BPS		5741.7	18	319.0		
CPS		3752.3	6	625.4		
BCP	BCPS	6224.5	6	1037.4	1.88	0.1400
BCPS		9937.7	18	552.1		

Note.

C refers to Same and Different Case Different trial types

B refers to the four blocks of trials

P refers to the three prime types

S refers to subjects

10. EXPERIMENT 2

ANALYSIS OF SAME RESPONSES INCLUDING NAME PRIMING GROUP FACTOR

SOURCE	ERROR	SUM SQUARES	DF	MEAN SQUARE	F	PROB
MEAN	S(N)	17647098.8	1	17647098.8	158.59	0.0062
N	S(N)	141919.1	1	141919.1	1.28	0.3760
B	BS(N)	25722.8	3	8574.3	6.37	0.0271
P	PS(N)	67931.2	4	16982.8	29.89	0.0001
S(N)		222554.2	2	111277.1		
NB	BS(N)	7300.4	3	2433.5	1.81	0.2461
NP	PS(N)	18276.5	4	4569.1	8.04	0.0066
BP	BPS(N)	10630.3	12	885.9	1.02	0.4656
BS(N)		8081.7	6	1347.0		
PS(N)		4545.2	8	568.2		
NBP	BPS(N)	9917.2	12	826.4	0.95	0.5200
BPS(N)		20935.2	24	872.3		

Note.

N refers to Name Priming Group

B refers to the four blocks of trials

P refers to the five prime types

S refers to subjects

11. EXPERIMENT 2

ANALYSIS OF DIFFERENT RTS, INCLUDING NAME PRIMING GROUP

SOURCE	ERROR	SUM SQUARES	DF	MEAN SQUARE	F	PROB
MEAN	S(N)	24479875.1	1	24479875.1	163.27	0.0061
N	S(N)	56915.7	1	56915.7	0.38	0.6006
B	BS(N)	6777.9	3	2259.3	1.79	0.2494
C	CS(N)	4558.2	1	4558.2	8.06	0.1049
P	PS(N)	249.3	2	124.6	0.19	0.8308
S(N)		299861.5	2	149930.8		
NB	BS(N)	2754.3	3	918.1	0.73	0.5723
NC	CS(N)	292.2	1	292.2	0.52	0.5469
BC	BCS(N)	1782.6	3	594.2	1.32	0.3510
NP	PS(N)	2853.2	2	1426.6	2.22	0.2242
BP	BPS(N)	8337.0	6	1389.5	8.72	0.0008
CP	CPS(N)	669.7	2	334.8	0.42	0.6805
BS(N)		7581.0	6	1263.5		
CS(N)		1131.1	2	565.6		
PS(N)		2566.5	4	641.6		
NBC	BCS(N)	643.5	3	214.5	0.48	0.7092
NBP	BPS(N)	3828.6	6	638.1	4.00	0.0196
NCP	CPS(N)	597.3	2	298.6	0.38	0.7070
BCP	BCPS(N)	6224.5	6	1037.4	1.50	0.2600
BCS(N)		2692.3	6	448.7		
BPS(N)		1913.2	12	159.4		
CPS(N)		3155.0	4	788.8		
NBCP	BCPS(N)	1614.5	6	269.1	0.39	0.8729
BCPS(N)		8323.2	12	693.6		

Note.

N refers to Name Priming Group

C refers to Same and Different Case Different trial types

B refers to the four blocks of trials

P refers to the three prime types

S refers to subjects

12. REANALYSIS OF EXPERIMENT 1

ANALYSIS OF SAME RESPONSES INCLUDING NAME PRIMING GROUP FACTOR

SOURCE	ERROR	SUM SQUARES	DF	MEAN SQUARE	F	PROB
MEAN	S(NG)	157514609.8	1	157514609.8	1140.14	0.0000
N	S(NG)	413708.8	1	413708.8	2.99	0.0946
G	S(NG)	26292.1	1	26292.1	0.19	0.6660
T	TS(NG)	116939.4	3	38980.0	7.82	0.0001
P	PS(NG)	54689.9	3	18230.0	29.13	0.0000
NG	S(NG)	25256.3	1	25256.3	0.18	0.6722
NT	TS(NG)	51380.3	3	17127.0	3.44	0.0205
GT	TS(NG)	5197.3	3	1732.4	0.35	0.7910
NP	PS(NG)	11960.2	3	3986.7	6.37	0.0006
GP	PS(NG)	2006.3	3	668.8	1.07	0.3668
TP	TPS(NG)	42920.4	9	4768.9	6.71	0.0000
S(NG)		3868289.8	28	138150.0		
NGT	TS(NG)	50977.2	3	16992.0	3.41	0.0212
NGP	PS(NG)	2550.7	3	850.2	1.36	0.2610
NTP	TPS(NG)	20316.4	9	2257.4	3.18	0.0012
GTP	TPS(NG)	2203.2	9	244.8	0.34	0.9592
TS(NG)		418731.7	84	4984.9		
PS(NG)		52560.8	84	625.7		
NGTP	TPS(NG)	10409.8	9	1156.6	1.63	0.1076
TPS(NG)		179068.6	252	710.6		

Note.

G refers to groups receiving or not receiving
Same-Name Different trials

N refers to Name Priming Group

T refers to the four levels of SOA

P refers to the four prime types

S refers to subjects

13. REANALYSIS OF EXPERIMENT 1

ANALYSIS OF ERROR RATES, SAME TRIALS, INCLUDING NAME PRIMING

GROUP FACTOR

SOURCE	ERROR	SUM SQUARES	DF	MEAN SQUARE	F	PROB
MEAN	S(NG)	5733.8	1	5733.8	100.59	0.0000
G	S(NG)	2.4	1	2.4	0.04	0.8391
N	S(NG)	15.3	1	15.3	0.27	0.6081
T	TS(NG)	73.1	3	24.4	1.64	0.1866
P	PS(NG)	145.6	3	48.5	3.01	0.0346
GN	S(NG)	10.0	1	10.0	0.17	0.6792
GT	TS(NG)	43.2	3	14.4	0.97	0.4114
NT	TS(NG)	16.3	3	5.4	0.37	0.7783
GP	PS(NG)	32.1	3	10.7	0.66	0.5762
NP	PS(NG)	44.9	3	15.0	0.93	0.4300
TP	TPS(NG)	85.7	9	9.5	0.68	0.7264
S(NG)		1596.0	28	57.0		
GNT	TS(NG)	81.3	3	27.1	1.82	0.1495
GNP	PS(NG)	18.5	3	6.2	0.38	0.7660
GTP	TPS(NG)	106.2	9	11.8	0.84	0.5766
NTP	TPS(NG)	81.1	9	9.0	0.64	0.7584
TS(NG)		1249.5	84	14.9		
PS(NG)		1353.3	84	16.1		
GNTP	TPS(NG)	307.4	9	34.2	2.44	0.0111
TPS(NG)		3524.6	252	14.0		

Note.

G refers to groups receiving or not receiving
Same-Name Different trials

N refers to Name Priming Group

T refers to the four levels of SOA

P refers to the four prime types

S refers to subjects

14. REANALYSIS OF EXPERIMENT 1

ANALYSIS OF SAME-NAME DIFFERENT RESPONSE TIMES, INCLUDING

NAME PRIMING GROUP FACTOR

SOURCE	ERROR	SUM SQUARES	DF	MEAN SQUARE	F	PROB
MEAN	S(N)	62278242.2	1	62278242.1	595.80	0.0000
T	TS(N)	20803.5	2	10401.7	1.82	0.1814
N	S(N)	288300.0	1	288300.0	2.76	0.1190
C	CS(N)	54794.7	3	18264.9	7.67	0.0003
S(N)		1463398.8	14	104528.5		
TN	TS(N)	2646.6	2	1323.3	0.23	0.7953
TC	TCS(N)	12236.4	6	2039.9	1.15	0.3399
NC	CS(N)	8390.1	3	2796.7	1.17	0.3310
TS(N)		160446.3	28	5730.2		
CS(N)		100040.1	42	2381.9		
TNC	TCS(N)	9252.5	6	1542.1	0.87	0.5198
TCS(N)		148711.7	84	1770.4		

Note.

N refers to Name Priming Group

C refers to four types of Different trials, including
Same-Name Different trials

T refers to the three levels of SOA

S refers to subjects

Appendix B

Median Reponse Times by Subject and Condition

Mean Error Rates by Subject and Condition

1. Experiment 1, Median Same Response Times

Control Group, Name Priming Absent

	300(1) msec SOA				300(2) msec SOA			
S#	PHYS	NAME	PLUS	UNRE	PHYS	NAME	PLUS	UNRE
1	0673.0	0654.0	0613.5	0612.0	0501.0	0553.0	0507.5	0555.0
2	0618.0	0612.5	0637.0	0621.5	0497.5	0564.5	0569.5	0576.0
3	0584.5	0607.0	0619.0	0607.0	0539.0	0589.0	0589.5	0609.0
4	0594.0	0597.0	0666.0	0647.5	0642.5	0635.0	0565.0	0599.0
5	0501.0	0569.5	0527.0	0531.5	0482.0	0477.0	0459.5	0518.0
6	0630.0	0618.0	0645.0	0662.0	0685.0	0709.5	0668.0	0743.0
7	0771.0	0734.5	0804.5	0903.0	0647.5	0696.5	0668.0	0667.0
8	0563.5	0560.0	0563.0	0617.0	0585.0	0618.0	0569.0	0635.5

	75 msec SOA				25 msec SOA			
S#	PHYS	NAME	PLUS	UNRE	PHYS	NAME	PLUS	UNRE
1	0562.0	0588.5	0586.0	0524.0	0598.0	0606.0	0576.5	0628.0
2	0528.0	0475.5	0486.0	0565.0	0543.0	0581.0	0577.0	0538.0
3	0521.0	0549.0	0569.0	0533.0	0579.0	0550.0	0546.0	0566.0
4	0552.0	0496.5	0544.0	0538.0	0551.5	0558.0	0563.0	0572.0
5	0473.0	0468.0	0451.0	0455.0	0479.0	0527.0	0467.0	0483.0
6	0638.0	0606.5	0642.5	0681.0	0582.0	0590.5	0598.0	0632.5
7	0551.5	0545.0	0563.0	0583.5	0605.0	0617.5	0602.5	0595.5
8	0525.0	0561.0	0525.0	0530.0	0560.0	0575.0	0546.5	0558.0

1. Experiment 1, Median Same Response Times

Control Group, Name Priming Present

	300(1) msec SOA				300(2) msec SOA			
S#	PHYS	NAME	PLUS	UNRE	PHYS	NAME	PLUS	UNRE
9	0462.0	0543.0	0507.0	0551.5	0462.0	0529.0	0554.5	0597.0
10	0692.0	0628.5	0689.0	0656.5	0565.5	0560.0	0594.5	0591.5
11	0413.5	0432.0	0486.0	0470.5	0380.5	0421.0	0453.0	0423.0
12	0717.0	0757.5	0772.0	0716.0	0692.0	0793.0	0836.5	0770.0
13	0416.0	0454.0	0492.0	0508.0	0368.5	0426.0	0462.0	0530.0
14	0482.0	0509.0	0550.0	0523.0	0489.0	0511.0	0601.5	0553.0
15	0403.0	0426.0	0433.0	0477.5	0401.5	0439.0	0483.0	0546.0
16	0458.0	0480.0	0462.0	0451.0	0440.5	0454.0	0470.5	0496.0

	75 msec SOA				25 msec SOA			
S#	PHYS	NAME	PLUS	UNRE	PHYS	NAME	PLUS	UNRE
9	0506.0	0520.0	0508.5	0507.0	0560.5	0567.0	0537.0	0530.0
10	0532.5	0554.0	0575.0	0601.0	0630.5	0603.0	0632.5	0573.0
11	0457.0	0417.5	0425.0	0419.0	0507.0	0443.5	0466.5	0474.5
12	0868.0	0922.0	0965.0	0982.0	0958.0	0850.0	0774.5	0928.0
13	0441.0	0443.0	0438.0	0507.0	0485.0	0454.0	0439.5	0459.0
14	0543.0	0589.5	0523.0	0539.5	0551.0	0535.5	0513.5	0553.0
15	0427.0	0412.0	0434.5	0434.0	0472.5	0480.0	0466.0	0486.5
16	0433.0	0453.0	0491.0	0461.5	0505.0	0507.0	0496.5	0491.5

1. Experiment 1, Median Same Response Times

Same Name Different Group, Name Priming Absent

	300(1) msec SOA				300(2) msec SOA			
S#	PHYS	NAME	PLUS	UNRE	PHYS	NAME	PLUS	UNRE
17	0801.5	0806.5	0724.0	0705.5	0615.0	0680.0	0684.5	0638.0
18	0529.0	0552.0	0570.5	0562.0	0448.0	0534.0	0540.0	0515.5
19	0479.0	0468.0	0515.5	0483.5	0408.0	0471.0	0448.0	0505.0
20	0614.0	0605.0	0652.5	0668.5	0511.0	0573.0	0564.0	0567.5
21	0783.0	0823.5	0808.0	0758.0	0786.0	0805.0	0746.5	0788.0
22	0438.0	0494.5	0495.0	0500.0	0453.5	0531.0	0499.5	0567.0
23	0523.0	0522.0	0529.0	0498.0	0485.0	0545.0	0500.5	0530.0
24	0603.5	0637.5	0610.0	0620.0	0576.0	0620.0	0556.0	0600.0

	75 msec SOA				25 msec SOA			
S#	PHYS	NAME	PLUS	UNRE	PHYS	NAME	PLUS	UNRE
17	0611.5	0681.5	0693.5	0614.0	0644.5	0651.0	0641.0	0652.0
18	0543.0	0570.5	0526.0	0543.0	0584.0	0517.0	0580.0	0537.0
19	0466.5	0501.0	0478.0	0488.0	0513.0	0494.0	0542.0	0505.0
20	0539.0	0558.5	0522.0	0546.5	0602.0	0595.5	0576.0	0586.0
21	0708.5	0706.0	0746.5	0700.5	0778.0	0848.0	0855.0	0825.5
22	0470.0	0464.0	0483.0	0478.0	0504.0	0533.0	0488.5	0527.0
23	0469.5	0479.0	0483.0	0494.5	0482.5	0502.5	0497.5	0523.0
24	0606.0	0600.5	0576.0	0644.5	0619.5	0588.5	0591.0	0569.5

1. Experiment 1, Median Same Response Times

Same Name Different Group, Name Priming Present

	300(1) msec SOA				300(2) msec SOA			
S#	PHYS	NAME	PLUS	UNRE	PHYS	NAME	PLUS	UNRE
25	0598.5	0599.5	0691.5	0664.5	0500.5	0521.0	0553.5	0531.5
26	0617.0	0684.0	0652.5	0683.0	0574.0	0514.0	0583.0	0679.0
27	0479.5	0472.5	0452.0	0478.0	0381.0	0418.0	0462.0	0481.0
28	0610.5	0587.5	0627.5	0661.5	0558.5	0557.5	0589.5	0555.5
29	0411.0	0436.0	0469.0	0515.5	0377.0	0437.0	0446.0	0528.0
30	0466.0	0487.0	0541.5	0542.0	0479.5	0471.0	0533.5	0473.0
31	0474.0	0542.0	0532.0	0493.0	0490.5	0486.0	0539.5	0546.0
32	0351.0	0388.5	0443.0	0467.0	0371.0	0437.0	0453.0	0477.0

	75 msec SOA				25 msec SOA			
S#	PHYS	NAME	PLUS	UNRE	PHYS	NAME	PLUS	UNRE
25	0529.5	0503.0	0567.5	0556.0	0569.0	0593.5	0581.0	0602.0
26	0478.5	0534.0	0502.0	0510.0	0539.0	0544.0	0524.0	0536.0
27	0401.0	0449.0	0402.0	0452.5	0455.5	0455.0	0423.0	0468.5
28	0552.5	0591.0	0567.0	0599.0	0680.5	0675.0	0693.5	0700.0
29	0444.0	0457.0	0436.0	0429.0	0481.0	0470.0	0498.5	0488.0
30	0492.0	0461.0	0525.5	0506.0	0446.0	0518.0	0490.5	0495.0
31	0498.0	0513.0	0525.5	0536.0	0497.5	0508.0	0504.5	0479.0
32	0414.5	0414.5	0429.0	0445.5	0476.0	0448.5	0429.0	0428.0

2. Experiment 1, Percentage of Errors, Same Trials

Control Group, Name Priming Absent

	300(1) msec SOA				300(2) msec SOA			
S#	PHYS	NAME	PLUS	UNRE	PHYS	NAME	PLUS	UNRE
1	03.3	10.0	00.0	00.0	03.3	03.3	10.0	05.0
2	03.3	00.0	00.0	00.0	06.7	06.7	00.0	00.0
3	06.7	03.3	10.0	05.0	03.3	03.3	00.0	05.0
4	03.3	03.3	15.0	00.0	06.7	06.7	00.0	05.0
5	00.0	00.0	00.0	00.0	00.0	03.3	10.0	00.0
6	00.0	03.3	15.0	05.0	06.7	00.0	05.0	05.0
7	00.0	00.0	00.0	05.0	00.0	00.0	00.0	05.0
8	00.0	03.3	05.0	05.0	00.0	00.0	10.0	00.0

	75 msec SOA				25 msec SOA			
S#	PHYS	NAME	PLUS	UNRE	PHYS	NAME	PLUS	UNRE
1	10.0	00.0	00.0	10.0	03.3	03.3	00.0	05.0
2	00.0	06.7	05.0	05.0	03.3	16.7	00.0	00.0
3	06.7	20.0	05.0	05.0	03.3	10.0	05.0	10.0
4	10.0	06.7	05.0	10.0	06.7	03.3	05.0	00.0
5	03.3	03.3	00.0	05.0	03.3	03.3	05.0	05.0
6	03.3	00.0	00.0	00.0	00.0	00.0	20.0	00.0
7	00.0	00.0	00.0	00.0	00.0	00.0	00.0	00.0
8	00.0	03.3	00.0	05.0	00.0	00.0	00.0	05.0

2. Experiment 1, Percentage of Errors, Same Trials

Control Group, Name Priming Present

	300(1) msec SOA				300(2) msec SOA			
S#	PHYS	NAME	PLUS	UNRE	PHYS	NAME	PLUS	UNRE
9	03.3	06.7	05.0	00.0	03.3	16.7	00.0	05.0
10	00.0	06.7	05.0	00.0	00.0	06.7	00.0	00.0
11	00.0	00.0	00.0	00.0	00.0	00.0	05.0	05.0
12	06.7	00.0	00.0	10.0	03.3	06.7	00.0	00.0
13	00.0	06.7	00.0	05.0	06.7	00.0	15.0	20.0
14	03.3	03.3	00.0	10.0	03.3	00.0	00.0	05.0
15	00.0	03.3	00.0	10.0	00.0	03.3	00.0	05.0
16	00.0	03.3	00.0	00.0	00.0	03.3	00.0	00.0

	75 msec SOA				25 msec SOA			
S#	PHYS	NAME	PLUS	UNRE	PHYS	NAME	PLUS	UNRE
9	03.3	10.0	10.0	15.0	00.0	03.3	05.0	05.0
10	00.0	00.0	00.0	00.0	00.0	03.3	00.0	00.0
11	13.3	00.0	05.0	05.0	00.0	06.7	00.0	00.0
12	00.0	00.0	05.0	00.0	00.0	00.0	00.0	00.0
13	03.3	00.0	15.0	05.0	03.3	00.0	00.0	10.0
14	06.7	00.0	10.0	00.0	03.3	00.0	00.0	00.0
15	00.0	03.3	00.0	00.0	00.0	00.0	00.0	00.0
16	03.3	03.3	05.0	00.0	03.3	03.3	00.0	10.0

2. Experiment 1, Percentage of Errors, Same Trials

Same Name Different Group, Name Priming Absent

	300(1) msec SOA				300(2) msec SOA			
S#	PHYS	NAME	PLUS	UNRE	PHYS	NAME	PLUS	UNRE
17	00.0	00.0	00.0	10.0	00.0	00.0	00.0	00.0
18	03.3	06.7	00.0	00.0	03.3	16.7	10.0	10.0
19	10.0	06.7	00.0	10.0	13.3	06.7	15.0	05.0
20	00.0	03.3	00.0	00.0	03.3	03.3	00.0	00.0
21	03.3	13.3	05.0	05.0	06.7	03.3	10.0	05.0
22	03.3	00.0	00.0	05.0	00.0	03.3	00.0	05.0
23	00.0	00.0	00.0	05.0	00.0	03.3	00.0	05.0
24	00.0	00.0	05.0	00.0	00.0	03.3	05.0	10.0

	75 msec SOA				25 msec SOA			
S#	PHYS	NAME	PLUS	UNRE	PHYS	NAME	PLUS	UNRE
17	00.0	00.0	00.0	10.0	00.0	03.3	05.0	00.0
18	10.0	13.3	05.0	05.0	03.3	10.0	10.0	05.0
19	00.0	03.3	10.0	05.0	03.3	06.7	00.0	10.0
20	00.0	00.0	00.0	00.0	00.0	00.0	00.0	00.0
21	00.0	03.3	00.0	00.0	00.0	03.3	00.0	00.0
22	00.0	06.7	10.0	00.0	00.0	06.7	00.0	05.0
23	00.0	06.7	05.0	00.0	06.7	06.7	00.0	00.0
24	00.0	06.7	00.0	00.0	00.0	00.0	05.0	10.0

2. Experiment 1, Percentage of Errors, Same Trials

Same Name Different Group, Name Priming Present

	300(1) msec SOA				300(2) msec SOA			
S#	PHYS	NAME	PLUS	UNRE	PHYS	NAME	PLUS	UNRE
25	00.0	00.0	00.0	00.0	00.0	00.0	00.0	00.0
26	00.0	03.3	00.0	00.0	00.0	03.3	00.0	00.0
27	00.0	06.7	00.0	05.0	06.7	00.0	05.0	05.0
28	00.0	00.0	00.0	00.0	13.3	00.0	00.0	00.0
29	03.3	00.0	00.0	20.0	03.3	03.3	00.0	15.0
30	03.3	00.0	00.0	05.0	00.0	03.3	10.0	05.0
31	03.3	03.3	00.0	05.0	06.7	03.3	00.0	05.0
32	03.3	00.0	05.0	05.0	03.3	03.3	05.0	05.0

	75 msec SOA				25 msec SOA			
S#	PHYS	NAME	PLUS	UNRE	PHYS	NAME	PLUS	UNRE
25	00.0	00.0	00.0	05.0	00.0	06.7	00.0	00.0
26	00.0	06.7	00.0	05.0	06.7	10.0	00.0	05.0
27	03.3	03.3	00.0	10.0	00.0	10.0	00.0	00.0
28	00.0	00.0	00.0	00.0	00.0	00.0	10.0	00.0
29	03.3	00.0	05.0	05.0	00.0	06.7	00.0	00.0
30	10.0	10.0	00.0	10.0	03.3	03.3	10.0	05.0
31	03.3	06.7	00.0	05.0	06.7	03.3	10.0	05.0
32	13.3	13.3	05.0	00.0	03.3	13.3	10.0	05.0

3. Experiment 1, Median Different Response Times

Control Group

SOA=300 msec, first block

	SAME CASE			DIFFERENT CASE		
	PHYS	NAME	PLUS	PHYS	NAME	PLUS
S#	Name Priming Absent					
1	687.5	647.5	749.5	617.0	664.0	645.0
2	640.0	693.0	640.0	607.0	648.0	612.0
3	519.0	594.5	627.5	534.0	559.0	561.5
4	707.0	632.0	638.0	675.0	569.0	611.0
5	571.0	507.5	638.5	549.0	548.0	552.0
6	693.0	868.5	725.5	652.0	679.0	746.0
7	741.5	689.0	726.0	726.0	722.0	725.0
8	579.0	636.5	593.0	534.0	534.0	568.5
S#	Name Priming Present					
9	553.5	631.0	647.5	643.0	589.0	637.0
10	695.0	656.5	672.5	720.0	643.0	752.0
11	577.0	513.5	499.0	538.0	473.0	531.0
12	1165.5	995.5	955.5	918.5	847.0	1233.0
13	469.5	560.0	504.0	484.0	474.0	460.0
14	603.0	595.5	598.5	512.0	533.0	553.0
15	453.0	481.0	462.5	456.0	493.0	502.0
16	628.0	536.0	513.0	505.0	552.0	499.0

3. Experiment 1, Median Different Response Times

SOA=300 msec, second block

	SAME CASE			DIFFERENT CASE		
	PHYS	NAME	PLUS	PHYS	NAME	PLUS
S#	Name Priming Absent					
1	772.0	775.5	578.5	544.0	542.0	549.0
2	571.0	548.5	519.5	529.0	507.0	522.0
3	585.0	628.0	574.0	566.0	584.0	584.0
4	624.5	651.5	630.0	607.0	600.0	621.0
5	488.5	535.0	528.0	470.0	461.0	501.0
6	728.5	712.0	813.0	708.0	695.0	652.0
7	635.0	801.0	633.5	627.0	670.0	582.0
8	617.5	634.0	578.0	560.0	614.0	549.0
S#	Name Priming Present					
9	629.0	700.0	663.0	575.0	608.0	567.0
10	584.0	616.5	573.0	605.0	583.0	643.0
11	430.5	441.0	448.0	452.0	476.0	427.0
12	724.0	995.0	932.5	1019.0	923.0	800.0
13	470.5	491.5	551.0	471.0	404.0	438.0
14	608.5	561.5	551.0	542.0	547.0	503.0
15	528.5	524.0	464.0	497.0	530.0	489.0
16	480.0	514.0	500.5	490.0	494.0	462.5

3. Experiment 1, Median Different Response Times

SOA=75 msec

	SAME CASE			DIFFERENT CASE		
	PHYS	NAME	PLUS	PHYS	NAME	PLUS
S#	Name Priming Absent					
1	561.0	532.0	619.5	574.0	536.0	556.0
2	509.0	504.5	504.5	483.0	457.0	493.0
3	585.0	559.0	569.0	525.0	544.0	530.0
4	523.5	502.5	500.5	508.0	518.0	517.0
5	479.0	548.5	495.0	422.0	471.0	467.0
6	746.0	726.0	674.5	653.0	668.0	626.0
7	536.5	559.0	520.0	498.0	528.0	512.0
8	556.0	546.0	545.0	500.0	507.0	520.0
S#	Name Priming Present					
9	593.0	595.0	540.5	592.0	547.0	612.0
10	588.5	590.5	560.0	575.0	584.0	557.0
11	437.5	436.5	450.0	433.0	430.0	424.0
12	814.0	904.0	965.0	864.0	1161.0	949.0
13	455.5	415.0	468.0	404.0	422.0	429.0
14	669.5	621.5	615.0	545.0	558.0	601.0
15	483.0	484.0	523.0	483.0	478.0	496.0
16	537.0	462.0	530.0	530.0	528.0	506.0

3. Experiment 1, Median Different Response Times

SOA=25 msec

	SAME CASE			DIFFERENT CASE		
	PHYS	NAME	PLUS	PHYS	NAME	PLUS
S#			Name Priming Absent			
1	581.5	538.5	595.0	585.0	594.0	569.0
2	497.0	531.5	545.0	486.5	491.0	491.0
3	624.0	552.0	652.5	521.5	566.0	585.0
4	548.5	574.0	564.0	594.0	559.0	580.0
5	500.0	514.5	534.0	488.0	481.0	551.0
6	626.5	583.0	663.5	642.5	628.0	607.5
7	598.0	564.5	599.5	596.0	617.0	555.0
8	574.0	541.0	538.5	548.0	545.0	547.0
S#			Name Priming Present			
9	822.0	553.5	690.0	596.0	590.0	686.5
10	630.0	596.0	628.0	620.0	638.0	617.0
11	473.5	431.5	419.5	422.0	425.0	422.0
12	977.5	905.5	1089.0	1168.0	845.0	1031.0
13	522.5	442.0	471.5	487.5	510.0	476.0
14	654.0	572.5	595.0	537.0	551.0	521.0
15	475.0	492.0	476.0	445.0	483.0	483.0
16	577.0	534.0	512.5	514.5	514.0	512.0

3. Experiment 1, Median Different Response Times

Same-Name Different Group

SOA=300 msec, first block

	SAME CASE			DIFFERENT CASE		
	PHYS	NAME	PLUS	PHYS	NAME	PLUS
S#	Name Priming Absent					
17	1343.0	860.5	793.0	780.0	910.0	723.0
18	587.0	602.0	590.0	634.0	619.0	569.0
19	530.0	468.5	504.0	476.0	472.5	528.0
20	610.5	931.5	626.5	632.0	641.0	687.0
21	939.0	1028.0	851.0	874.0	850.0	826.0
22	507.0	502.0	495.0	529.0	563.0	514.0
23	555.5	557.5	528.5	517.0	507.0	509.0
24	672.5	684.0	673.0	659.0	635.0	655.0
S#	Name Priming Present					
25	737.0	789.0	805.0	795.0	793.0	746.0
26	666.0	1222.0	644.5	798.0	651.0	681.0
26	662.0	504.0	540.5	570.0	515.0	580.0
28	777.0	616.5	704.0	656.0	659.0	659.0
29	505.0	504.0	525.5	490.5	532.0	488.0
30	565.0	521.5	551.0	528.5	506.0	496.0
31	525.0	519.5	527.0	521.0	546.5	497.0
32	503.5	482.5	480.0	453.0	477.5	489.0

3. Experiment 1, Median Different Response Times

SOA=300, second block

	SAME CASE			DIFFERENT CASE		
	PHYS	NAME	PLUS	PHYS	NAME	PLUS
S#	Name Priming Absent					
17	792.5	824.0	689.5	866.0	702.0	654.5
18	533.0	515.0	587.0	500.0	493.0	523.0
19	427.0	428.5	441.0	400.0	454.5	527.5
20	645.5	641.5	525.0	597.0	599.0	570.0
21	862.0	1007.0	866.0	807.5	866.5	886.5
22	613.0	671.5	456.5	483.5	520.0	469.0
23	546.5	541.0	545.0	492.5	568.0	535.5
24	628.5	653.0	610.0	616.5	656.0	587.0
S#	Name Priming Present					
25	600.0	655.5	597.0	522.0	591.5	601.5
26	528.0	715.0	549.5	675.5	539.0	590.0
27	510.0	465.0	475.5	474.0	450.5	453.0
28	569.0	601.0	684.0	604.0	597.0	544.0
29	534.0	492.5	496.0	486.0	470.0	483.0
30	515.0	476.0	447.0	480.5	487.0	482.5
31	560.0	464.0	522.5	482.0	508.0	526.5
32	503.0	499.5	462.0	460.5	457.0	473.5

3. Experiment 1, Median Different Response Times

SOA=75 msec

	SAME CASE			DIFFERENT CASE		
	PHYS	NAME	PLUS	PHYS	NAME	PLUS
S#	Name Priming Absent					
17	715.0	649.0	824.0	753.5	616.5	658.5
18	524.0	497.0	506.0	509.0	484.0	498.5
19	469.5	473.0	524.0	476.0	458.5	501.0
20	550.5	494.0	513.5	518.0	504.0	551.0
21	747.5	813.5	840.5	719.5	869.5	677.5
22	473.0	481.0	494.0	529.0	513.0	486.0
23	499.0	468.0	483.0	515.5	492.5	476.0
24	671.5	642.0	660.5	624.0	596.5	609.0
S#	Name Priming Present					
25	566.0	696.0	613.5	541.0	583.0	574.0
26	537.0	524.0	494.0	484.5	462.0	468.5
27	496.0	489.5	514.5	500.5	470.0	462.0
28	529.5	537.5	564.0	566.5	538.5	553.0
29	465.0	523.0	499.5	508.0	513.5	495.0
30	484.0	444.5	447.5	434.0	449.0	435.5
31	559.0	574.5	508.0	505.5	506.5	515.5
32	486.5	498.0	495.5	468.5	517.0	464.5

3. Experiment 1, Median Different Response Times

SOA=25 msec

	SAME CASE			DIFFERENT CASE		
	PHYS	NAME	PLUS	PHYS	NAME	PLUS
S#	Name Priming Absent					
17	654.5	616.0	732.0	682.0	693.0	655.0
18	534.5	510.5	576.0	514.0	551.0	515.0
19	471.0	476.0	482.0	468.0	458.5	441.0
20	599.5	646.0	539.5	555.5	571.0	599.0
21	941.5	844.0	876.0	803.5	812.0	869.0
22	585.0	477.5	481.0	516.5	521.5	481.0
23	534.5	530.0	455.0	495.0	483.5	517.0
24	645.0	680.0	610.0	598.5	619.5	592.5
S#	Name Priming Present					
25	616.5	555.0	576.5	560.0	604.5	569.5
26	549.5	495.0	525.0	508.5	478.0	468.0
27	481.0	472.5	498.0	453.5	432.5	447.5
28	679.0	756.5	783.0	757.0	661.5	708.0
29	548.0	546.5	498.5	524.0	509.5	486.0
30	427.5	434.0	486.5	446.5	436.5	461.0
31	577.0	528.5	527.0	496.5	552.0	524.0
32	463.0	464.0	503.0	466.0	447.5	463.0

4. Experiment 1, Percentage of Errors, Different Trials

Control Group

	SOA=300 msec, first block						SOA=300 msec, second block					
	Same Case			Different Case			Same Case			Different Case		
	Name Priming Absent											
S#	PHYS	NAME	PLUS	PHYS	NAME	PLUS	PHYS	NAME	PLUS	PHYS	NAME	PLUS
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	10.0	0.0	0.0	6.7	6.7	4.8	10.0	0.0	0.0	6.7	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	4.8	0.0	10.0	7.1	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	4.8
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	10.0	0.0	0.0	20.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	7.1	0.0	0.0	4.8	0.0	0.0	7.1	0.0	0.0	0.0
	Name Priming Present											
S#	PHYS	NAME	PLUS	PHYS	NAME	PLUS	PHYS	NAME	PLUS	PHYS	NAME	PLUS
9	0.0	0.0	0.0	0.0	13.3	9.5	0.0	0.0	7.1	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	14.3	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	6.7	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0
13	20.0	10.0	14.3	6.7	6.7	0.0	20.0	20.0	7.1	6.7	13.3	4.8
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8
16	0.0	10.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	6.7	4.8

4. Experiment 1, Percentage of Errors, Different Trials

Control Group

	SOA=75 msec						SOA=25 msec					
	Same Case			Different Case			Same Case			Different Case		
	Name Priming Absent											
S#	PHYS	NAME	PLUS	PHYS	NAME	PLUS	PHYS	NAME	PLUS	PHYS	NAME	PLUS
1	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	7.1	6.7	0.0	0.0
3	0.0	0.0	0.0	6.7	0.0	0.0	10.0	10.0	0.0	6.7	0.0	4.8
4	0.0	0.0	0.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	14.3
5	10.0	0.0	7.1	0.0	0.0	9.5	10.0	0.0	7.1	0.0	0.0	0.0
6	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	0.0	4.8
7	0.0	0.0	7.1	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0
8	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Name Priming Present											
S#	PHYS	NAME	PLUS	PHYS	NAME	PLUS	PHYS	NAME	PLUS	PHYS	NAME	PLUS
9	10.0	50.0	0.0	13.3	20.0	4.8	0.0	0.0	0.0	6.7	0.0	4.8
10	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	20.0	0.0	14.3	0.0	0.0	0.0	20.0	0.0	0.0	6.7	0.0	9.5
14	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	0.0
15	0.0	0.0	7.1	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0
16	10.0	0.0	7.1	0.0	0.0	0.0	0.0	10.0	0.0	6.7	0.0	0.0

4. Experiment 1, Percentage of Errors, Different Trials

Same Name Different Group

	SOA=300 msec, first block						SOA=300 msec, second block					
	Same Case			Different Case			Same Case			Different Case		
	Name Priming Absent											
S#	PHYS	NAME	PLUS	PHYS	NAME	PLUS	PHYS	NAME	PLUS	PHYS	NAME	PLUS
17	10.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0.0	0.0	14.3	0.0	0.0	0.0	10.0	10.0	0.0	10.0	10.0	7.1
19	20.0	0.0	7.1	6.7	6.7	0.0	0.0	0.0	7.1	10.0	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	10.0	10.0	0.0	0.0	0.0	0.0	0.0	10.0	7.1	0.0	0.0	0.0
22	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0
24	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Name Priming Present											
S#	PHYS	NAME	PLUS	PHYS	NAME	PLUS	PHYS	NAME	PLUS	PHYS	NAME	PLUS
25	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0	14.3	0.0	0.0	0.0
26	0.0	10.0	0.0	0.0	0.0	9.5	10.0	20.0	0.0	0.0	0.0	0.0
27	10.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	7.1
28	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	10.0	0.0	0.0	6.7	6.7	0.0	0.0	0.0	7.1	0.0	0.0	0.0
30	0.0	0.0	7.1	6.7	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0	6.7	0.0	10.0	0.0	0.0	0.0	0.0	0.0
32	20.0	0.0	7.1	0.0	6.7	4.8	0.0	0.0	21.4	0.0	0.0	0.0

4. Experiment 1, Percentage of Errors, Different Trials

Same Name Different Group

	SOA=75 msec						SOA=25 msec					
	Same Case			Different Case			Same Case			Different Case		
	Name Priming Absent											
S#	PHYS	NAME	PLUS	PHYS	NAME	PLUS	PHYS	NAME	PLUS	PHYS	NAME	PLUS
17	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	0.0
18	20.0	10.0	7.1	0.0	10.0	14.3	0.0	0.0	14.3	10.0	10.0	7.1
19	0.0	10.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	0.0
22	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1
23	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0
	Name Priming Present											
S#	PHYS	NAME	PLUS	PHYS	NAME	PLUS	PHYS	NAME	PLUS	PHYS	NAME	PLUS
25	0.0	10.0	0.0	10.0	0.0	0.0	0.0	10.0	0.0	10.0	0.0	0.0
26	10.0	10.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	7.1
27	10.0	0.0	0.0	0.0	0.0	0.0	10.0	20.0	0.0	0.0	0.0	0.0
28	0.0	20.0	7.1	0.0	0.0	7.1	10.0	0.0	0.0	0.0	0.0	7.1
29	10.0	10.0	0.0	0.0	0.0	0.0	0.0	20.0	14.3	0.0	0.0	0.0
30	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	0.0	10.0	14.3	0.0	0.0	0.0	30.0	10.0	7.1	10.0	0.0	7.1

5. Experiment 1, Median Different Response Times

Including Same-Name Different Responses

SOA=300(2) msec

	+ BD	+ Bd	b Bb	+ Bb
17	689.5	654.5	786.0	737.0

S#	Name	Priming	Absent	Group
18	587.0	523.0	514.0	572.0
19	441.0	527.5	516.0	407.5
20	525.0	570.0	565.5	678.0
21	866.0	886.5	876.5	892.0
22	456.5	469.0	750.0	676.0
23	545.0	535.5	506.0	591.5
24	610.0	587.0	642.5	647.0

Name Priming Present Group

S#	+ BD	+ Bd	b Bb	+ Bb
25	597.0	601.5	626.5	654.0
26	549.5	590.0	573.0	756.0
27	475.5	453.0	466.0	440.0
28	684.0	544.0	524.0	544.5
29	496.0	483.0	516.0	576.5
30	447.0	482.5	490.0	441.5
31	522.5	526.5	564.0	492.5
32	462.0	473.5	510.0	488.0

5. Experiment 1, Median Different Response Times

Including Same-Name Different Responses

SOA=75 msec

S#	Name Priming Absent Group			
	+ BD	+ Bd	b Bb	+ Bb
17	824.0	658.5	628.0	753.5
18	506.0	498.5	548.0	512.0
19	524.0	501.0	495.5	539.0
20	513.5	551.0	599.5	576.5
21	840.5	677.5	705.0	925.0
22	494.0	486.0	490.5	496.0
23	483.0	476.0	538.0	573.5
24	660.5	609.0	641.0	660.5
	Name Priming Present Group			
S#	+ BD	+ Bd	b Bb	+ Bb
25	613.5	574.0	614.0	629.0
26	494.0	468.5	488.0	459.0
27	514.5	462.0	490.0	465.5
28	564.0	553.0	572.5	557.0
29	499.5	495.0	523.0	563.0
30	447.5	435.5	455.5	460.0
31	508.0	515.5	592.5	544.0
32	495.5	464.5	489.0	518.0

5. Experiment 1, Median Different Response Times

Including Same-Name Different Responses

SOA=25 msec

S#	+ BD	+ Bd	b Bb	+ Bb
	Name Priming Absent Group			
17	732.0	655.0	634.0	636.5
18	576.0	515.0	552.5	544.5
19	482.0	441.0	511.5	556.0
20	539.5	599.0	694.0	677.0
21	876.0	869.0	874.0	901.0
22	481.0	481.0	577.5	544.0
23	455.0	517.0	557.0	534.0
24	610.0	592.5	711.5	654.0
	Name Priming Present Group			
S#	+ BD	+ Bd	b Bb	+ Bb
25	576.5	569.5	643.5	614.5
26	525.0	468.0	553.0	518.5
27	498.0	447.5	518.5	484.0
28	783.0	708.0	723.0	702.0
29	498.5	486.0	588.0	530.0
30	486.5	461.0	463.0	460.5
31	527.0	524.0	558.0	538.5
32	503.0	463.0	476.0	485.0

6. Experiment 1, Percentage of Errors, Different Trials
Including Same-Name Different Trials

Name Priming Absent

	300(2) msec SOA				75 msec SOA				25 msec SOA			
S#	+ BD	+ Bd	b Bb	+ Bb	+ BD	+ Bd	b Bb	+ Bb	+ BD	+ Bd	b Bb	+ Bb
17	0.0	0.0	0.0	7.1	0.0	0.0	0.0	0.0	7.1	0.0	0.0	0.0
18	0.0	7.1	5.0	7.1	7.1	14.3	10.0	7.1	14.3	7.1	10.0	0.0
19	7.1	0.0	20.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	10.0	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	7.1	0.0	0.0	0.0	0.0	0.0	15.0	7.1	7.1	0.0	0.0	7.1
22	0.0	0.0	5.0	14.3	0.0	0.0	0.0	0.0	0.0	7.1	0.0	7.1
23	0.0	0.0	5.0	0.0	7.1	0.0	5.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0

Name Priming Present

	300(2) msec SOA				75 msec SOA				25 msec SOA			
S#	+ BD	+ Bd	b Bb	+ Bb	+ BD	+ Bd	b Bb	+ Bb	+ BD	+ Bd	b Bb	+ Bb
25	14.3	0.0	0.0	0.0	0.0	0.0	10.0	7.1	0.0	0.0	0.0	0.0
26	0.0	0.0	10.0	0.0	0.0	0.0	0.0	7.1	0.0	7.1	0.0	0.0
27	0.0	7.1	5.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	7.1
28	0.0	0.0	0.0	0.0	7.1	7.1	0.0	7.1	0.0	7.1	0.0	0.0
29	7.1	0.0	10.0	14.3	0.0	0.0	5.0	7.1	14.3	0.0	5.0	7.1
30	0.0	0.0	15.0	14.3	0.0	0.0	10.0	21.4	0.0	0.0	10.0	0.0
31	0.0	0.0	0.0	0.0	7.1	0.0	0.0	7.1	0.0	0.0	5.0	0.0
32	21.4	0.0	5.0	7.1	14.3	0.0	5.0	14.3	7.1	7.1	5.0	7.1

7. Experiment 2, Median Same Response Times

NAME PRIMING ABSENT

S#	B	PHYS	NAME	PLUS	UNSC	UNDC
1	1	446.0	484.0	467.0	519.0	498.5
1	2	405.0	433.5	461.0	451.0	431.0
1	3	423.0	448.0	411.0	494.0	434.0
1	4	457.0	524.0	477.5	521.0	508.5
2	1	554.5	599.0	633.5	574.0	615.0
2	2	507.5	563.0	531.5	523.5	551.5
2	3	535.5	552.0	526.0	659.5	512.5
2	4	513.0	534.5	550.0	594.5	547.0

NAME PRIMING PRESENT

S#	B	PHYS	NAME	PLUS	UNSC	UNDC
3	1	352.5	369.5	374.0	456.0	417.0
3	2	313.0	350.0	361.0	386.0	405.0
3	3	314.0	349.0	375.0	391.0	411.0
3	4	298.0	339.0	354.0	369.0	410.0
4	1	441.5	445.5	527.0	554.0	671.0
4	2	415.0	438.5	490.0	571.0	480.0
4	3	395.5	434.0	480.0	553.0	515.0
4	4	392.5	453.0	484.5	482.0	485.0

8. Experiment 2, Median Different Response Times

NAME PRIMING ABSENT

		SAME CASE			DIFFERENT CASE		
S#	B	PHYS	NAME	PLUS	PHYS	NAME	PLUS
1	1	510.0	421.0	497.0	482.5	457.0	474.0
1	2	485.0	462.0	502.0	472.0	463.0	463.0
1	3	489.0	502.0	477.0	478.0	486.0	463.0
1	4	552.0	470.0	468.0	482.0	476.0	504.0
2	1	607.0	634.0	635.0	612.0	541.0	607.0
2	2	555.0	599.0	594.0	558.0	512.0	528.5
2	3	590.0	593.0	553.0	565.0	579.0	580.0
2	4	581.0	548.0	587.0	555.5	581.0	577.0

NAME PRIMING PRESENT

		SAME CASE			DIFFERENT CASE		
S#	B	PHYS	NAME	PLUS	PHYS	NAME	PLUS
3	1	425.0	441.5	437.0	435.5	404.0	421.0
3	2	373.0	458.5	433.0	413.0	384.0	400.0
3	3	450.0	429.0	418.5	436.0	414.0	383.0
3	4	452.0	444.0	366.0	405.5	410.0	407.0
4	1	570.0	574.0	557.0	526.0	499.0	570.0
4	2	509.0	552.0	533.0	503.0	540.0	564.0
4	3	551.0	567.0	569.0	560.0	585.0	574.0
4	4	526.0	525.0	498.0	522.5	564.0	491.0

Appendix C

Task Instructions

Task Instructions

"This is what I would like you to do. When the fixation dot comes on in the centre of the screen you can initiate a trial by pressing this bar with your left index finger. After doing this a letter will flash just above where the fixation point was. This letter is not to be responded to but is a cue or warning for the two letters which will appear shortly after in a lower position. Your task is to respond Same by pressing this button (with your right index finger/with your right middle finger) if the two letters are physically identical, and respond Different by pressing the other button (with your right middle finger/with your right index finger) if they are not identical. Remember to judge on the basis of letter shape. Two capital A's would be the same, but a capital A and capital B would be different, and so would a capital A and a small a, as they look different. It is very important that you respond quickly and accurately, but don't respond so quickly that you make errors. If you find yourself making errors try to be more careful. There will be a break in today's session about half way through. However if you wish to rest between trials sometimes that's fine. Just wait before initiating another trial with your left hand. Remember not to respond to the first letter, but to respond to the pair that come on together on the basis of shape. Try not to make errors. The first ten trials are practice trials. You can begin when you are ready."

Appendix D

HP9825A Controlling Program

Trial Presentation and Response Recording

```
0: dim X[21,30],S[2,50,4],D[6,17,4],T[2],L[6],I[4],R[1],P[17]
1: dim J$[20],N$[6],O$[6],P$[6]
2: 300→L[1]→L[2]→L[3]→L[4]
3: dsp "Insert Disk 16";stp
4: dsp "Name-Physical Prime Program";stp
5: ent "Condition-C(0),L(1)",A
6: ent "Right=Same(1) orLeft=Same(-1)",H
7: for I=1 to 4
8: ent "SOA#s,in order by Block",I[I]
9: next I
10: ent "Sname;Sex;Date",J$
11: ent "SNUMBER",r9
12: files Prilet,*,*,*
13: ent "Subject file",N$
14: ent "Subject data file(SAME)",O$
15: ent "Subject data file(DIFFERENT)",P$
16: asgn N$,2
17: asgn O$,3
18: asgn P$,4
19: wtb 706,27,40,65;wtb 706,27,38,100,68
20: wtb 706,27,38,107,49,83
21: wtb 706,"                                                    ",10,13
22: wtb 706,"        Name-Physical Prime Program         ",10,13
23: if A=0;wtb 706,"CONDITION C",10,13
24: if A=1;wtb 706,"CONDITION L",10,13
25: wtb 706,27,38,100,65;wtb 706,27,38,107,48,83
26: wtb 706,"Letter Set→BCDFGHJMNR"
27: if H=-1;wrt 706,"Left=Same;DISK 16"
28: if H=1;wrt 706,"Right=Same;DISK 16"
29: wrt 706,"Data File for this Session(SAME)-",O$
30: wrt 706,"Data File for this Session(DIFFERENT)-",P$
31: fmt 9,6f1.0
32: wrt 706.9,"SOA Order:",I[1],I[2],I[3],I[4]
33: fmt 8,f2.0
34: wrt 706.8,"Subject/Sex/Date/SFile-",J$[1,20]," ",N$
35: wtb 718,3,20,13,10,"em::en::ex::sn::sx::um::"
36: on end 1,"U"
37: rread 1,1;sread 1,X[*]
38: "U":trk 1;ldf 36
*30970
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```
0: if H=-1;oni 2,"int2L"
1: if H=1;oni 2,"int2P"
2: sprt 2,I[*],H,A,L[*],J$
3: wrt 9,"A U4=I4 U4G"
4: fmt 1,"pe0,:pa",f4.0,",",f4.0,";"
5: fmt 2,"pe1,:pa",f4.0,",",f4.0,";"
6: fmt 5,f2.0,","
7: wrt 718,"bm,::"
8: int((15-8.703)/.9282865)→r1→r3
9: for T=1 to 2
10: for P=1 to 50
11: for I=1 to 4
12: 0→S[T,P,I]
13: next I
14: next P
15: next T
16: for T=1 to 6
17: for P=1 to 17
18: for I=1 to 4
19: 0→D[T,P,I]
20: next I
21: next P
22: next T
23: for G=1 to 4
24: int((L[I[G]]-15-8.703)/.9282865)→r4
25: for Q=0 to 202
26: if Q≠0;gto "Real"
27: if G=1;for B=1 to 2
28: for O=1 to 17;0→P[O];next O
29: for C=1 to 20
30: "O":int(rnd(S)*17)+1→O;rnd(S)→S
31: if P[O]=1 and C<18;gto "O"
32: 1→P[O]
33: gsb "K"
34: int(rnd(S)*2)+1→M;rnd(S)→S
35: if O<5;K→L;sfg 1;gto "Pr"
36: if O<9;K+10→K→L;sfg 1;gto "Pr"
37: if G≠1 and A≠0 and O>14 and M=1;K+10→L;gto "Pr"
38: if G≠1 and A≠0 and O>14 and M=2;L+10→K;gto "Pr"
39: if O<12 and M=1;gto "Pr"
40: if O<12 and M=2;K+10→K;L+10→L;gto "Pr"
41: if M=1;K+10→K;gto "Pr"
42: if M=2;L+10→L;gto "Pr"
43: "Pr":int(rnd(S)*2)+1→M;rnd(S)→S
44: K→T[1];L→T[2]
45: if (O=1 or O=5 or O=9 or O=12 or O=15) and M=1;K→N
46: if (O=1 or O=5 or O=9 or O=12 or O=15) and M=2;L→N
47: if (O=2 or O=6 or O=10 or O=13 or O=16) and M=1;K+10→N;if N>20;K-10→N
48: if (O=2 or O=6 or O=10 or O=13 or O=16) and M=2;L+10→N;if N>20;L-10→N
49: if O=3 or O=7 or O=11 or O=14 or O=17;21→N
50: if M=2 and (O=4 or O=8);N+10→N
51: gto "Show"
52: "Real":int(rnd(S)*2)+1→R[1];rnd(S)→S
53: gsb "K"
54: if R[1]=2;gto "D"
55: K→L
56: int(rnd(S)*2)+1→T;rnd(S)→S
57: if T=2;K+10→K→L
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58: int(rnd(S)*50)+1}P;rnd(S)}S
59: if S[T,P,I[G]]≠0;gto "Real"
60: sfg 1;K}T[1]}T[2]
61: if P<16;K}N;gto "Show"
62: if P<31;K+10}N;if N>20;K-10}N;gto "Show"
63: if P>30 and P<41;21}N;gto "Show"
64: if P>40 and P<46 and K>10;N+10}N
65: if P>45 and K<11;N+10}N
66: gto "Show"
67: "D":int(rnd(S)*6)+1}T;rnd(S)}S
68: int(rnd(S)*17)+1}P;rnd(S)}S
69: if D[T,P,I[G]]≠0;gto "Real"
70: int(rnd(S)*2)+1}M;rnd(S)}S
71: if T=2;K+10}K;L+10}L
72: if T=3;L+10}L
73: if T=4;K+10}K
74: if T=5 and G≠1 and A≠0;K+10}L
75: if T=6 and G≠1 and A≠0;L+10}K
76: if T=5 and (G=1 or A=0);10}L
77: if T=6 and (G=1 or A=0);K+10}K
78: K}T[1];L}T[2]
79: if P<6 and M=1;K}N;gto "Show"
80: if P<6 and M=2;L}N;gto "Show"
81: if P<11 and M=1;K+10}N;if N>20;K-10}N;gto "Show"
82: if P<11 and M=2;L+10}N;if N>20;L-10}N;gto "Show"
83: if P>10;21}N
84: gto "Show"
85: "Show":wrt 718,"WX15,";cli 7;1}V;0}Z;sfg 2
86: fxd 0
87: "DSP":dsp N,T[1],T[2],T,P
88: 488}U;1}V
89: for E=1 to 2
90: for W=1 to V
91: if flg2;N}Z;525}R
92: if not flg2;T[W]}Z;487}R
93: for I=1 to 30 by 2
94: if flg2;wrt 718,"nf1,::"
95: if not flg2;wrt 718,"nf2,::"
96: if X[Z,I]+X[Z,I+1]=0;gto "V"
97: wrt 718.1,X[Z,I]+U,X[Z,I+1]+R
98: wrt 718.2,X[Z,I]+U,X[Z,I+1]+R
99: next I
100: "V":U+28}U;next W
101: wrt 718,":sn::"
102: cfg 2;2}V;474}U;next E
103: wrt 718,"nf7,::fl1000,::pe0,:pa496,522;:pe1,:pa496,522;:pe0,::"
104: wrt 718,"pe0,::sn::"
105: "Present":wrt 718,"wx0,"
106: wrt 718,":uf7,::"
107: wti 0,2;wtc 2,40
108: gto +0;rdi 5}r5;if r5>32;gto +1
109: wrt 718,"bf7,::"
110: wrt 718,"uf1,"
111: wait r1
112: wrt 718,"bf1,"
113: wait r4
114: wrt 9,"U4G U4C"
115: wrt 718,"uf2,:";cfg 10,11
116: wti 0,2;wtc 2,40;eir 2
117: gto +0;if flg10 or flg11;gto +1
118: wrt 718,"bf2,";wrt 718,"ef1,::ef2,::"
119: if flg11;gto "11"
120: "10":if flg1;1}Y;gto "Record"
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121: -1}Y;gto "Record"
122: "11":if not flg1;1}Y;gto "Record"
123: -1}Y
124: "Record":if Q=0;gto +3
125: if R[1]=1;cfg 1;Y*F}S[T,P,I[G]];dsp S[T,P,I[G]]
126: if R[1]=2;cfg 1;Y*F}D[T,P,I[G]];dsp D[T,P,I[G]]
127: if Q=0;cfg 1;next C
128: if Q=0 and G=1;next B
129: next Q
130: beep;wait 100;beep;wait 50;beep
131: if G=2;dsp "BREAK";for I=1 to 4;beep;wait 32767;next I;dsp "END OF BREAK"
132: next G
133: beep;wait 100;beep;wait 100;beep
134: for T=1 to 2
135: for P=1 to 50
136: for I=1 to 4
137: sprt 3,S[T,P,I]
138: next I
139: next P
140: next T
141: for T=1 to 6
142: for P=1 to 17
143: for I=1 to 4
144: sprt 4,D[T,P,I]
145: next I
146: next P
147: next T
148: if G=5;beep;wait 100;beep;wait 300;beep;wait 100;beep;stp
149: if G=4;trk 1;ldp 21
150: "END":end
151: "int2L":wrt 9,"U4V";red 9,F
152: rdi 4}r6
153: if bit(0,r6);sfg 10;iret
154: if bit(1,r6);sfg 11;iret
155: "int2R":wrt 9,"U4V";red 9,F
156: rdi 4}r6
157: if bit(0,r6);sfg 11;iret
158: if bit(1,r6);sfg 10;iret
159: "K":int(rnd(S)*10)+1}K;rnd(S)}S
160: if K=2;gto "K"
161: "L":int(rnd(S)*10)+1}L;rnd(S)}S
162: if K=L or L=2;gto "L"
163: "N":int(rnd(S)*10)+1}N;rnd(S)}S
164: if N=K or N=L or N=2;gto "N"
165: ret
*19370
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